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WARRANTY GUIDEBOOK

A reference for use by DoD managers in developing, applying and administering warranties

Defense Systems Management College
Fort Belvoir, Virginia
October 1992

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PREFACE

Title 10, Section 2403, of United States Code requires that a warranty be considered for inclusion in the procurement of major weapon systems. Perhaps no other provision of the defense acquisition reform initiatives of the 1980s has proved so unwieldy to implement. June 1987 and September 1989 General Accounting Office audit reports leveled considerable criticism at Department of Defense warranty implementation and administration. The armed services have been criticized by their internal audit/inspection agencies for weapon system warranty indiscretions. Many germane and perplexing questions persist:

- How should complex weapon system essential performance characteristics be warranted?
- What should a warranty cost?
- Do assurances exist that the benefits of a warranty will prove cost-effective?
- Can realistic, measurable and enforceable terms and conditions be developed?
- Who will administer the warranty and how?
- Under what conditions are such warranties inappropriate?

The Department of Defense and the armed services have addressed these questions through policy directives, guidance documents, research contracts, workshops, audits, and myriad other techniques. However, it is incumbent upon program managers to exercise considerable thought and effort to enact weapon system warranties which comply with the spirit and letter of the law. Formidable problems are manifested by military supply-maintenance interfaces and automated systems which were not designed to accommodate warranties. Accordingly, warranties have worked "around the system" rather than "through the system."

This guidebook is designed to assist program managers in the military services to meet the requirements of warranty law. It is not a cookbook to follow in prescribed measures for guaranteed results. It addresses a wide range of topics, from warranty acquisition strategy to development of terms and conditions to operational phase coordination. Program managers must remember the intent of the Congress was to purchase weapon system warranties that are meaningful and make good business sense. Despite the challenges inherent in development and administration, weapon system warranties can be successful.

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CHAPTER ONE

INTRODUCTION

1.1 PURPOSE

This guidebook is a reference for military program managers who are tasked to include a warranty provision in weapon system or equipment procurement contracts as required by law. It includes warranty applications that are designed to meet the current statutory requirements as well as more extensive forms of warranty. The guidebook is also designed for use as a text by the Defense Systems Management College (DSMC) to train program management personnel in warranty development and application. This reference is not directive.

1.2 SCOPE

The *Warranty Guidebook* addresses actions to meet the requirements of Title 10, § 2403, of the United States Code, herein referred to as 10 USC 2403, which, in general, requires that warranties be secured for all weapon system procurements. This guidebook is applicable to all the military services. To meet the requirements for effective warranty application, it is necessary to consider activities ranging from developing acquisition strategy through planning for the operational phase of the weapon system life cycle.

Warranties in military procurement contracts are not new. Although 10 USC 2403 levied unique warranty requirements and controls, it nevertheless extended latitude to program managers to narrow or broaden the scope of warranty coverage as deemed necessary for effective application. The guidebook focuses on the law's basic provisions, but it also addresses more diverse forms of warranty and contractor incentives for completeness. The term "system," as used herein, applies to line items and individual units as well.

1.3 USE

No guidebook can replace the good judgment, experience, and hard work necessary to devise, evaluate, implement, and administer weapon system warranties. Nevertheless, this guidebook can enhance the aforementioned attributes by consolidating reference material, data, examples, lessons learned, development guidelines, and supporting appendix material into a single reference. There are no absolutes in the development, implementation, and management of warranties under 10 USC 2403. Since decisions made during each acquisition phase can affect the remaining system life cycle, the program manager should read the complete document at least once before embarking

on a warranty development program. The result will be a better understanding of long-range impacts of early warranty decisions. Such sensitivity is mandatory if a program manager is to do the job well.

1.4 WARRANTY ISSUES

Before continuing, it is advisable to build a firm foundation of warranty issues upon which to base future considerations. The following basic principles are applicable for all warranties, be they in the Government or commercial sector:

- Items under warranty may fail.
- Warranties are not free (if not an accounting cost, there is an economic cost).
- A warranty does not ensure a particular level of quality or performance for a system under specified conditions.
- Warranties indicate levels of quality or performance for which suppliers are willing to accept liability, subsequent to delivery and final acceptance.

Most consumers erroneously assume that an item under warranty should not fail during the warranty period. In fact, warranted items do fail, more likely nearer the end of the warranty period than the beginning. When a warranted item is purchased, the sale price has normally been increased on an actuarial basis to cover the "expected" cost to the supplier to repair or replace the item during the warranty period. In the absence of a warranty, repair contracts are sometimes sold by suppliers to cover all repairs for a specified period of time. Nevertheless, in the Government sector warranty costs may be included in the sale price of a weapon system, or priced and negotiated as a separate line item. In either sector, a warranty is not an "iron clad" assurance that a certain length of service or level of performance will be achieved. Instead, a warranty defines the supplier's liability if the item fails to attain quality or performance claims.

There are similarities and extensive differences between commercial and military warranty contracting. Both commercial and military warranties define what is to be warranted, the warranty duration, acceptable conditions, and the supplier's liability. However, program managers should not approach weapon system warranties from the perspective of a small commercial consumer. The differences between commercial and military warranties are profound and their understanding bears on the potential success in weapon system applications. The requirements of commercial warranties are defined by competitively self-determined marketing considerations. The requirements of weapon system warranties are specified by the customer (Government). Commercial warranties enjoy the benefits of extensive market research whereas weapon system warranties do not. Commercially warranted items are manufactured prior to sale; warranted weapon systems are manufactured after sale. Commercial warranties are generally provided in lieu of other rights and entitlements of the customer; weapon system warranties are generally provided in addition to other rights and entitlements of the Government. Commercial warranties enjoy utility by spreading small risk increments over massive numbers of

consumers; weapon system warranties cannot spread incremental risks beyond one massive consumer (Government). Commercial warranties routinely employ "factory-authorized" service, but weapon system warranties generally involve service performed by the user. Lastly, commercial warranties are associated with an "orderly" user environment. Weapon system warranties, on the other hand, are attendant to a "hectic" user environment (Reference 1).

1.5 ESSENTIAL PERFORMANCE REQUIREMENTS

The central theme which distinguishes 10 USC 2403 from prior standard warranty clauses is the mandate to warrant essential performance requirements (EPRs). EPRs are defined by 10 USC 2403 as "operating capabilities and/or reliability and maintenance characteristics of a weapon system that are determined by the Secretary of Defense (or delegated authority) as necessary for the system to fulfill the military requirement for which it is designed." Numerous "essential performance requirements" may be embedded in a weapon system. They have been stated as objectives, goals, and thresholds, or even embodied the entirety of the specifications. Compliance with the majority of stated performance characteristics should be the object of the design, development, and evaluation process. That is, the Government implicitly seeks to verify that the contractor's design will attain specified performance requirements through a review of specifications and drawings, qualification test results, and acceptance procedures.

A warranty on EPRs, however, survives acceptance of the product. Hence, the Government, in conjunction with the contractor, must clearly identify those selected performance characteristics which transcend the normal acceptance process. Instead of several hundred or so essential performance characteristics within a weapon system contract, there should be succinctly few parameters. Irrefutable sources of EPRs are the Mission Need Statement (MNS) and the Operational Requirements Documents (ORDs). The Government needs to clearly describe required performance and evaluation methods attendant to system operation and then satisfactorily negotiate compliance responsibilities with the contractor.

If an EPR is selected without due consideration for measurement, enforcement, implementation, and administration, the results are almost guaranteed to be unfavorable. Selecting only a few requirements as "essential" does not make all others frivolous. The warranty process starts with the limitation and selection process of EPRs—what precise qualities must the weapon system continue to exhibit in the post-acceptance period. The importance of this process is perhaps superseded only by the importance of the implementation process. A good limitation and selection process will not guarantee warranty program success; a poor limitation and selection process, in contrast, may condemn the warranty program to certain failure.

1.6 WARRANTY PROBLEMS

There are a number of problems implicit in the weapon system warranty process which must be overcome, or at least circumvented, to achieve success. Most notably is funding. When the Congress passed the law, it did not appropriate additional resources to establish, implement, and administer weapon system warranty programs. The assets necessary to manage weapon system warranty programs must come from the internal service reallocations of existing assets and priorities. Other problems related to weapon system warranty administration are:

- Connectivity: Field activities, item managers, warranty coordinators/managers, integrated logistics support managers, program managers, contracting officers, and contractors do not share a common, automated system for reporting and processing warranty claims, maintenance actions, or spare/repair parts requisitions for warranty actions. The armed services, for that matter, do not share a common maintenance management or logistical system. Massive interlocking bands of notification and coordination may be needed to process a simple warranty claim.
- Divergent priorities: Field activities are primarily concerned with repair of broken systems without warranty administrative burdens. A contractor, on the other hand, is concerned with validation of failure conditions and warranty liabilities prior to initiating repair actions.
- Measurement: Many systems or components do not readily lend themselves to calculations pertaining to breaches of warranty thresholds or provisions. In the absence of "hours-operated," "miles-driven," or "rounds-fired" meters, calculations or determinations pertinent to warranty entitlement can become difficult and administratively burdensome.
- Feedback: One of the principles of management is "feedback." Without feedback, managers cannot compare actual results with established standards, detect deviations, and take corrective action before a sequence of events is completed. The absence of automated information systems which capture, compute, and report warranty claims can relegate warranty information gathering and reporting to expensive, labor-intensive sample data collection efforts. There is often no readily apparent method to decipher success from failure.
- Response time: Because many warranty claims have to be processed "off-line" and the distances between field activities and contractor activities can stretch half-way around the world, "claim submitted" to "claim resolved" times can become unwieldy. Measures must be taken to prevent warranty processing time from unfavorably impacting upon system readiness postures.
- Equitable compensation: Most warranties do not stipulate a part-for-part, repair-for-repair compensation to the field activity which experienced and reported the failure. Instead, monetary remuneration is made by the contractor directly to the Treasury of the United States. While this may satisfy the provisions of the

contract and the laws of the land, it does not engender enthusiastic participation among field activities.

In proceeding with this text, it would be wise to remember some cardinal principles:

- Weapon system warranties should not be unduly complicated.
- Developing, structuring, tailoring, implementing, and administering weapon system warranties requires a comprehensive understanding of the underlying service's maintenance and supply systems.
- Warranties can provide incentives as well as penalties for contractors.
- Well negotiated warranties have the potential to provide benefits to both contractors and the military.
- Developing and implementing weapon system warranties involves hard work.

CHAPTER TWO

WARRANTY DEFINITIONS, HISTORY, LAW, AND POLICIES

2.1 WARRANTY DEFINITIONS

The term *warranty* is defined in Federal Acquisition Regulation (FAR) Subpart 46.701 as "a promise or affirmation given by a contractor to the Government regarding the nature, usefulness, or condition of the supplies or performance of services furnished under the contract." "Warranty" and "guarantee" are terms used interchangeably by the Department of Defense (DoD). A comprehensive warranty definition is:

> A legally binding guarantee—usually explicit, but in certain cases implicit—whereby a contractor, with or without an explicit payment, agrees to remedy defects in design, manufacture, workmanship, materials, or performance existing at a specific time or emerging over a specific period in a weapon system. It may, in addition, provide positive incentives to exceed target specifications in these characteristics, or penalties if specific targets are not achieved (Reference 2).

To provide a basis for further warranty discussions, the following additional definitions are provided:

- *Acceptance:* The act of an authorized Government representative by which the Government, for itself or as an agent of another, assumes ownership of existing identified supplies tendered or approves specific services rendered as partial or complete performance of the contract.
- *Correction:* Elimination of a defect.
- *Defect:* Any condition or characteristic in supplies or services furnished by the contractor under the contract that is not in compliance with the requirements of the contract.
- *Design and manufacturing requirements:* Structural and engineering plans and manufacturing particulars, including precise measurements, tolerances, materials, and finished product tests for the weapon system produced.
- *Initial production quantity:* The quantity of weapon systems contracted for in the first program year of full-scale production.
- *Inspection:* Examination and testing of supplies or services (including raw materials, components, and intermediate assemblies, when appropriate) to determine whether they conform to contract requirements.

- *Mature full-scale production:* Follow-on production of a weapon system after the manufacture of the initial production quantity or one-tenth of the eventual total production quantity, whichever is less.
- *Prime contractor:* Party that enters into an agreement directly with the Government to furnish a system or a major subsystem.
- *Redesign:* A set of activities and materials to correct the failure of a system to conform to EPRs which include the following:
  (1) Engineering analyses to determine causes of nonconforming units.
  (2) Corrective engineering design and drawing changes.
  (3) Modification of units and spares as required.
  (4) Retest, retrofit, and actions associated with configuration management.
- *Repair:* Return of a system to serviceable condition.
- *Warranty breach:* A failure to meet warranty terms and conditions.
- *Warranty remedy:* Contractor actions to satisfy obligations under the terms of the warranty when a warranty breach occurs.
- *Weapon system:* System or major subsystem used directly by the armed forces to carry out combat missions.

2.2 ACQUISITION CONTROLS ON QUALITY AND PERFORMANCE

Until the passage of Public Law (P.L.) 98-212 as part of the Defense Appropriations Act of 1984, the use of warranties in military procurements was not mandatory. However, warranties were used by military services for some time and some were quite extensive with regard to coverage, risks, and cost. There are also a number of other controls on quality and performance that were and continue to be commonly employed and complement the use of warranties. These controls and earlier warranty experiences are reviewed in the following sections.

2.2.1 Requirements, Inspection, and Acceptance

Government policy stipulates that contracts include inspection and other quality requirements, such as warranty clauses, necessary to protect the Government's interests (FAR 46.103). In military procurements, quality and performance requirements are normally established through contract specifications. Applicable standards and specifications provide detailed procedures to ensure that quality and performance requirements are satisfied.

Acceptance by the Government acknowledges that the weapon system conforms to applicable contractual quality and performance requirements. Usually, acceptance by the Government is conclusive except for latent defects or fraudulent actions by the contractor, or as otherwise provided in the contract. Thus, for a typical procurement, the Government specifies its requirements and validates that they have been met through the inspection and acceptance process.

2.2.2 Latent Defects

A latent defect exists at the time of acceptance by the Government, but does not manifest itself until sometime after acceptance. The purpose of including a latent-defects provision in a warranty is to provide remedies to the Government when a defect exists in an offered product that is neither readily apparent nor detectable by reasonable testing and acceptance procedures.

In theory, if a product exhibits a defect after acceptance (and it can be "proven" that the defect was resident in the item at time of acceptance) the burden for correction or replacement is on the contractor. In practice, providing such proof can be tenuous, if not impossible. For example, consider a truck tire, purchased by the Government, that experiences a blowout after only several miles of use. A failure analysis may reveal tread separation, which was not likely to have occurred as a result of limited use, caused the blowout. On the other hand, consider a tire on a Navy carrier-based aircraft that has been used for months and experiences a blowout after a hard landing. It would be much more difficult to prove that the second tire had a defect at time of acceptance. A warranty clause has the potential to alleviate such uncertainties regarding latent defects by making the conditions clear under which a warranty claim can be made, regardless of the condition of the product at time of acceptance.

2.3 HISTORY OF MILITARY WARRANTY

Section I-324 of the Armed Service Procurement Regulation (ASPR), which contained regulations on the use of warranties, was issued in 1964. The section, updated periodically, has been generally interpreted to mean that the use of extensive, long-term warranties should be the exception rather than the rule. For commercial items, the military normally obtains a standard, existing warranty if the planned usage is consistent with normal commercial purposes.

Early Government safeguards against acquisition of defective material included warranty control against latent defects. In the late 1960s and early 1970s more extensive forms were undertaken, such as on the Navy F-4 gyro failure-free warranty and the Air Force ARN-118 TACAN reliability improvement warranty (RIW) (References 3 and 4). Indication of potential success for these selected programs encouraged the Office of the Secretary of Defense (OSD) and the services to enter into a "trial period" for more extensive warranty variations, particularly RIW and mean time between failure guarantees (MTBFGs). During the mid-1970s, these types of warranties were secured on such equipment as the Army ARN-123 radio and Lightweight Doppler Navigation System, the Navy APN-194 altimeter, and nine line replaceable units (LRUs) on the Air Force F-16. In addition, a dialogue opened between industry and DoD concerning warranty issues as newer and more extensive warranty variants were implemented by all the military services. The services supported research studies to evaluate warranty applications and to develop analysis and implementation tools (References 5, 6, 7, and 8). By the beginning of the 1980s, the use of warranties in the acquisition of military systems

became a "standard" option; however, it was only selectively applied and usually required special program office efforts to develop and implement.

In 1980, the Air Force issued the first *Product Performance Agreement Guide*, which provided a summary of the features of various warranty forms that could be used in military procurements. The guide was later revised in 1985 (Reference 9). In 1982, the Product Performance Agreement Center (PPAC) was established to provide an Air Force focal point for use of product performance agreements/warranties. Also in 1982, DoD issued a set of initiatives (known as the Carlucci Initiatives) to improve and streamline the acquisition process. They included warranties as one means of achieving desired levels of system reliability and maintainability.

By the early 1980s, the use of warranties in the acquisition of military systems became a "standard option," but it was only selectively applied and usually required a unique effort on the part of the program office to develop and implement. The present phase of warranty policy in weapon systems procurement was initiated by Congress in response to rising public concern about performance deficiencies in major programs and the overpricing of some highly publicized components. Legislative action marked the passage of Section 794 of the Defense Appropriations Act of 1984. A DoD Defense Guidance Memorandum clarified intended implementation. Section 794 and the attendant Guidance Memorandum imposed inflexible, omnibus, ambiguous, and potentially burdensome mandates upon both DoD and weapon system contractors. The ensuing debate on the appropriate, efficient, and equitable means of improving weapon system quality eventuated in the replacement of Section 794 with a new tenet—the Defense Procurement Reform Act of 1984, P.L. 98-525—Title 10 U.S. Code, §2403 (Reference 2).

2.4 CURRENT WARRANTY LAW

Title 10, U.S. Code, §2403 (appendix A), effective January 1985, is entitled "Major Weapon Systems: Contractor Guarantees." The law requires the prime contractor for a production weapon system to provide written guarantees for any procurement after 1 January 1985. It delineates the types of coverage required, lists the required remedies, and specifies reasons for securing a waiver and actions to be taken in the event a waiver is sought. The law also provides relief from full coverage for new items and suggests that guarantees be tailored to the needs of the procuring agency and weapon system user. Table 2-1 summarizes the essential features of the law.

In conjunction with the passage of 10 USC 2403, DoD issued a guidance document in the form of a revised DoD Defense Federal Acquisition Regulation Supplement (DFARS Subpart 246.7) (appendix B). Subpart 246.770, "Warranties in Weapon System Acquisitions," specifically addresses the new warranty law and provides guidance and direction in such areas as tailoring, Government-furnished property, foreign military sales, warranty cost-benefit analysis, and waiver procedures.

TABLE 2-1

TITLE 10, § 2403, UNITED STATES CODE

FACTOR	DEFINITION	DESCRIPTION
Coverage	Weapon systems	Used in combat missions; unit cost is greater than $100,000 or total procurement exceeds $10,000,000.
Warrantor	Prime contractor	Party that enters into direct agreement with Government to furnish part or all weapon systems.
Warranties	Design and manufacturing requirements	Item meets structural and engineering plans and manufacturing particulars.
	Defects in materials and workmanship	Item is free from such defects at time of delivery to the Government.
	EPRs	Operating capabilities or maintenance and reliability characteristics of item necessary to fulfill military requirements.
Exclusions	Government furnished property (GFP), government furnished equipment (GFE), government furnished material (GFM)	Items provided to the contractor by the Government.
	EPRs for items not in mature full-scale production	First 1/10 of total production quantity or initial production quantity, whichever is less.
Waivers	Necessary in interest of national defense; not cost-effective	Assistant Secretary of Defense or Assistant Secretary of the Military Department is lowest authority to grant waiver; prior notification to House and Senate committees required for major weapon systems.
Remedies	Contractor corrects failure at no additional cost to Government; contractor pays reasonable costs for Government to correct	Other remedies may be specified; contract price may be reduced.
Tailoring	Exclusions, limitations, and time duration	Specific details negotiated.
	Dual-source procurements	Relieve second source from guaranteeing EPRs for initial product delivered.
	Extensions	Extend coverage and remedies as deemed beneficial.

2.4.1 Requirements of Warranty Law

The following subsections summarize the requirements of 10 USC 2403 and applicable DoD guidance.

2.4.1.1 Coverage

The law applies to all weapon system procurements starting after 1 January 1985. Weapon systems are defined as "items that can be used directly by the Armed Forces to carry out combat missions and cost more than $100,000 or for which the eventual total procurement cost is more than $10,000,000." Although the date and dollar amounts are fairly clear, the combat mission orientation has caused considerable debate. The guidance provided by DoD in DFARS Subsection 246.770-1 interprets the weapon system definition broadly. Table 2-2 contains a list of weapons systems specifically included. The systems listed are intended for use in carrying out combat missions. Only support equipment (ground handling equipment, for example), training devices, ammunition, and commercial items are specifically excluded. Commercial warranties, modified as appropriate, may be obtained for nondevelopmental or other items that do not fall within the weapon system definition.

TABLE 2-2

WEAPON SYSTEMS

Tactical and strategic missiles
Missile launching systems
Guided munitions
Mines and torpedoes
Tactical and strategic bomber and fighter aircraft
Reconnaissance and electronic warfare aircraft, and other electronic warfare systems
Cargo aircraft and helicopters
Naval vessels
Fire control systems
Propulsion systems
Surveillance, command, control, and communications systems
Self-propelled and towed howitzers, fixed guns, and mortars
Safety and survival systems

2.4.1.2 Warrantor

As stipulated in 10 USC 2403, the prime contractor provides the warranty. For larger weapon systems for which there are subcontractors, the prime contractor may impose warranty requirements on the subcontractors; however, the prime assumes responsibility in the event of a warranty breach.

In practice, there may be a relationship established between the Government and a subcontractor to conduct normal warranty activities. For example, to minimize turnaround time, the Government may ship a failed system directly to a subcontractor rather than

through the prime contractor. Such a relationship should not relieve the prime contractor from ultimate warranty responsibility; this should be made clear in the contract.

2.4.1.3 Guarantees

The law requires that specific types of "guarantees" (DFARS uses the term "warranty") be provided:

- Design and manufacturing requirements.
- Defects in materials and workmanship.
- Essential performance requirements.

Warranty on Design and Manufacturing Requirements

Design and manufacturing requirements are the "structural and engineering plans and manufacturing particulars, including precise measurements, tolerances, materials, and furnished product tests." This type of warranty provides assurance that the product is designed and built as specified. It covers such features as size, weight, interfaces, power requirements, processes, tests, and material composition. For many design and manufacturing requirements, a one-time verification may be all that is necessary; for example, it is unlikely that the size or weight of an electronic system will change without some specific design or manufacturing change. Periodic audits can be conducted during a production run to ensure continuity of adherence to design and manufacturing requirements.

Warranty Against Defects in Materials and Workmanship

As stated in 10 USC 2403, "the item provided under the contract, at the time it is delivered to the United States, will be free from all defects in materials and workmanship." DFARS Subpart 246.7 uses the term "weapon system" instead of "item" and specifically defines acceptance criteria. Clearly, this clause is meant to control latent defects. A discovery period equivalent to the warranty duration applicable to the control on EPRs is often specified.

Warranty of Conformance to EPRs

EPRs represent a radical departure from former procurement practices in that they extend the contractor's liability to operational performance, including reliability and maintainability. The "old way" requirement was to pass a reliability acceptance test. This has given way to the "new way" warranty—measure field reliability and/or maintainability over a period of time and compare to the guaranteed value(s) to determine conformance. The contractor is responsible for corrective action (to include redesign if required) in the event of failure to meet a warranted EPR. Such liability imposes a challenge upon the program manager to ensure that the warranty terms and conditions are fair and equitable, the

conditions of compliance are readily determinable, and the warranty can be implemented and administered without undue burden to field and support activities.

For many of the warranties contracted, the issue of defining EPRs to be guaranteed is sidestepped by including all requirements contained in applicable specifications. Such an approach has led to problems. Some requirements were not meant to apply under operational considerations (for example, mean time between failure (MTBF) values tested by MIL-STD-781 procedures) and others were not easily measured in the field without special instrumentation or controlled testing (such as missile accuracy). As an example of selective use of guaranteed requirements, the warranty on the Air Force alternate fighter engine included controls on engine removal rate, specific fuel consumption, and engine thrust—all extending for up to eight years after engine acceptance.

EPRs should represent system-level characteristics rather than those of subsystems and components. The system specifications must be analyzed to determine which elements are candidates for warranty coverage because of their importance to the overall performance of the system and because of the risk they present to production and subsequent operation. It is important that EPRs selected be under the control of the contractor or that they be derived from specifications with which the contractor is required to comply.

It is imperative that EPRs be determinable and/or readily measurable. They may represent system characteristics that are not normally measurable at acceptance or during acceptance testing. EPRs should be characteristics which reflect required performance in the field. EPRs transcend the delivery and acceptance process (Reference 10).

2.4.1.4 Exclusions

Guarantee of EPRs applies only to weapon systems in mature, full-scale production—that is, weapon systems manufactured after the first one-tenth of the total production or after the initial production quantity, whichever is less. In other words, low-rate initial production (LRIP) quantities may be excluded. In practice, program managers may want to include LRIP deliveries under a warranty umbrella. If problems are embedded in a weapon system, it is not in anyone's best interest to postpone corrections. Additionally, DoD guidance specifically excludes Government-furnished items, except possibly for installation. Other exclusions, such as failures resulting from mishandling or mistreatment for which there is no warranty coverage, may be added as appropriate.

2.4.1.5 Waivers

The warranty law allows the services to waive all or part of the coverage requirements of the statute if it is determined (1) that the waiver is necessary in the interest of national defense, or (2) that a guarantee under that subsection would not be cost-effective. Waiver authority is no lower than an Assistant Secretary. DoD may issue class waivers

when justified. If a waiver is granted, notification or reports to the Senate and House Committees on Armed Services and Appropriations must be made as follows:

- Major weapon systems: Thirty days prior to granting a waiver, the committees shall be notified in writing of the intent to waive and reasons for the waiver. If a major weapon system not yet in mature, full-scale production will not include an EPR warranty, then notice of such exemption shall be given.
- Other weapon systems: An annual report listing all waivers granted and the reasons therefor shall be submitted by 1 February of each year.

To date, the use of waivers has been virtually nil. The reasons should not come as a surprise. The process of securing a waiver is likely to be protracted and significantly delay obligation of funds. Fielding schedules, with all their integrated support planning considerations, would almost surely slip. If funds are not obligated in a timely manner, reprogramming may even result. Nevertheless, a weapon system warranty projected to be non-cost-effective should trigger the waiver process.

2.4.1.6 Remedies

If a system fails to meet any warranty stipulated in the contract, then, under 10 USC 2403, the contractor is required to:

- Promptly take corrective action necessary to correct the failure at no additional costs to the United States, or;
- Pay costs reasonably incurred by the United States in taking such corrective action.

In addition to the statutory requirements, DFARS Subpart 246.7 allows the contracting officer to equitably reduce the contract price.

Some warranties were written that simply repeat the wording of the law, while others go into endless detail to spell out the remedies. While simplicity is a laudable objective, there generally should be more detail than a restatement of the legal requirement. For example, what does "promptly" mean with regard to correcting a problem? What if a weapon system is returned for which the contractor can find no problem? If the problem is due to a faulty part design, does replacing the failed part with an identical one destined to soon fail again constitute a valid correction?

Another important issue with regard to warranty breach and remedy is the means to determine if a warranty breach has occurred. The Government expects to receive warranty services when a breach occurs, but it should not have the unlimited right to send weapon systems back for warranty service without some verification of occurrence of a breach. In the same sense, the contractor should not be able to claim, without adequate support, that a breach has not occurred, because of either a "no-evidence-of-failure" result or applicability of a warranty exclusion.

2.4.1.7 Warranty Tailoring

The wording of 10 USC 2403 and the ensuing DFARS Subpart 246.7 suggests that tailoring of the warranty terms and conditions to match the system, procurement, and operational conditions is necessary to develop a cost-effective approach. Tailoring of warranty clauses is more easily said than done; some services have found standard clauses more to their liking because of their potential to reduce downstream conflict. The law suggests that specific details regarding reasonable exclusions, limitations, and time duration be negotiated. Tailoring may relieve a second source from guaranteeing EPRs for initial deliveries or extend coverage and remedies as deemed appropriate. Guarantees that provide more comprehensive remedies than those provided in the statute may also be considered. In DFARS Subpart 246.7, such factors as technical risk, contractor financial risk, and program uncertainties are listed as potential reasons to limit the contractor's liability under the terms of the warranty. Also, it is not DoD policy to include contractor liability for loss, damage, or injury to third parties. Tailoring is not to be used as a substitute for acquiring a warranty waiver.

2.4.2 Cost-Benefit Analysis

The cost-effectiveness of a potential warranty should be a major determinant of whether a waiver should be requested. DFARS Subpart 246.7 requires that a warranty cost-benefit analysis be conducted and documented in the contract file. The DFARS requires a comparison of the benefits of a warranty with its acquisition and administrative costs. Where possible, a comparison should also be made with the costs of obtaining and enforcing similar warranties on similar systems. A life-cycle-cost (LCC) basis may be used, comparing LCC with and without a warranty. Such an approach has been used in the past on programs that have considered using the more extensive types of warranty such as reliability improvement warranty and MTBF guarantees. Nevertheless, performing a cost-benefit analysis on an as yet unassembled weapon system is, at best, an estimate. Whatever the method used, it should be both disciplined and documented. Methodology and service models used are presented herein.

2.4.3 Other Warranty Policy Issues

DFARS Subpart 246.7 also offers guidance in the following areas:

- Government-furnished property (GFP): Warranties on GFP shall not generally be required by the prime contractor except for defects in installation, installation or modification that invalidates a warranty provided by the manufacturer of the GFP, or modifications made to the GFP by the prime contractor.
- Alternate source contractor(s): Alternate source contractor(s) may be excluded from the EPRs clause until that contractor manufactures the first one-tenth of the total anticipated production quantity.

- Foreign military sales (FMS): Warranties are not mandatory for FMS production contracts. However, it is DoD policy to obtain the same warranties for FMS purchasers as obtained by the United States for defects in materials and workmanship and also conformance to design and manufacturing requirements. Normally, essential performance warranties will not be obtained for FMS purchasers. Warranty costs for FMS purchasers may be higher than for the United States and the FMS purchasers must bear all of the warranty acquisition and administration costs.
- Commercial supplies: The DFARS references FAR 46.709 regarding warranties of commercial supplies. Generally, the Government may adopt the contractor's standard commercial warranty if it is consistent with rights that would be afforded the Government under a warranty-of-supplies clause or other contract terms. If the Government's specifications have altered the item, or if the planned usage of the item differs from normal usage, the warranty language should be altered appropriately. Forms of commercial warranty have been used by the military on vehicles, guns, and avionics.

2.5 SERVICE WARRANTY POLICY

2.5.1 U.S. Army

Army warranty policy is provided in Army Regulation (AR) 700-139, Army Warranty Program Concepts and Policies (appendix C). Although focused on 10 USC 2403, this regulation also applies to non-statute warranties. The Army regulation establishes responsibilities, defines policy and procedures, and standardizes the information, fielding, execution, and compliance for all warranties.

AR 700-139 directs material developers to establish a warranty information database for various interested activities and to provide an electronic mailbox for information flow. Major commands (MACOMs) are directed to establish a warranty control office or officer (WARCO) at the MACOM level to ensure effective execution of warranties.

With respect to warranty concepts, RIWs are specifically exempted from coverage in the regulation, since such an approach is considered to be a reliability improvement incentive. Since another regulation (AR 702-3) was previously prepared for the reliability improvement concept, the Army chose not to include that concept in AR 700-139. The Army considers RIWs to be useful in unique instances where reliability is known to be deficient and reliability growth is possible.

Policy guidance reflects the Army's belief that one of the most effective remedies available to achieve the required performance requirements is the redesign of defective parts. Acquisition managers have been directed not to exclude a redesign remedy from warranty coverage.

According to AR 700-139, warranty coverage for centrally procured equipment should generally include both coverage for failures of individual systems and coverage for system-wide defects; the latter may involve a potential redesign liability. If claim processing costs are expected to exceed estimated claim recovery costs, only systemic coverage should be used. Warranty duration should be 10% to 25% of the expected life and generally not less than one calendar year of operation.

2.5.2 U.S. Navy

Navy warranty policy is contained in Secretary of the Navy Instruction (SECNAVINST) 4330.17, Navy Policy on Use of Warranties (appendix D). The instruction emphasizes Navy objectives to obtain and administer warranties that enhance the quality, reliability, and performance of systems, subsystems, and materials. The Chief of Naval Operations is the primary operant of Navy warranty actions. Of note, insofar as Navy warranty administration is concerned:

- It is unsaid, but understood, that warranties obtained from contractors are "free." They are not priced as separate contract line items as is the practice in the Army and Air Force. The net effect is to truncate the cost portion of a cost-benefit analysis to in-house administrative costs.
- Naval Sea Systems Command (NAVSEASYSCOM), Naval Air Systems Command (NAVAIRSYSCOM), and Space and Naval Warfare Command (SPAWAR) all operate independent, self-directed warranty programs.

2.5.3 U.S. Air Force

Air Force warranty policy is provided in Air Force Regulation (AFR) 70-11, Weapon System Warranties (appendix E). The objectives of the Air Force Weapon System Warranty Program are to develop and acquire warranties that:

- Motivate the contractor to ensure product quality and performance.
- Continue contractor responsibility and involvement beyond the delivery date and for the entire warranty period
- Are easy to manage and administer, such that there is no disruption to existing military systems and procedures.
- Are enforceable.
- Are affordable in relation to certain benefits.

The Air Force has the most extensive experience with incentive forms of warranties, particularly RIWs, MTBFGs, and logistics support cost guarantees (LSCGs). To provide a central resource for warranty/guarantee development, the Air Force established the PPAC in 1982. Unfortunately, the PPAC was closed in 1990.

2.5.4 U.S. Marine Corps

The Marine Corps warranty policy is contained in Marine Corps Order (MCO) 4105.2, Marine Corps Warranty Program (appendix F). The Marine Corps has not been a major factor in weapon system warranties because most of its acquisitions are other service procurements. Implementation and administration problems are compounded, however, by having to interoperate with the nonorganic supply, maintenance, and reporting systems of other services.

2.6 WARRANTY FOCAL POINTS

Appendix G lists offices designated as DoD and service warranty focal points.

CHAPTER THREE

WARRANTY CONCEPTS

3.1 WARRANTY FUNCTIONS

Warranties are tools. Their optimal use is determined by their contribution to production of higher quality weapon systems within appropriate life-cycle costs. Their potential roles are intertwined with such implicit characteristics of the acquisition process as the force of competition, the pervasive uncertainties of advanced technology, and contractor vulnerability to the temptations of moral hazard. Warranties are contractual instruments which may aid DoD to cope with these characteristics. The following warranty functions are classified with those process characteristics in mind:

- Assurance Validation: Warranties help assure DoD that the contractor delivers a product whose design and manufacture, as well as materials and workmanship, conform to contractual specifications. Since it is assumed that such defects can be avoided by ordinary management prudence, the costs of providing remedial action should be borne by the contractor. Assurance validation, in the strictest sense, ends at the acceptance of the system with respect to patent defects and after a reasonable period with respect to latent defects.
- Incentivization. Warranties ostensibly incentivize the contractor as a matter of course. This function, however, becomes truly distinctive when guarantee provisions define penalties for failure to achieve target parameters and/or rewards for "overachievement" of such targets.
- Insurance: Every warranty provides a measure of insurance against the risks of repair or replacement costs. This function becomes noteworthy or dominant when the warranty protects DoD against substantial contingent losses due to support costs or to inadequacies in periods extending significantly into the post-acceptance phase (Reference 2).

3.2 WARRANTY FORMS

Four garden-variety warranty forms surfaced in response to 10 USC 2403.

3.2.1 Failure-Free Warranty

This is the most conventional form of warranty (sometimes known as "zero-defects warranty"). It may have both assurance and incentive features. Consider a warranty that

identifies several performance requirements for warranty coverage. As required by law, the warranty also covers defects in materials and workmanship. The warranty may be worded such that all failures that occur during the warranty period are covered—regardless of whether the failure exists at time of delivery, and regardless of whether the population reliability level exceeds a specified value. For this "failure free" concept, the performance requirements represent an assurance form of warranty, but the defects clause has an inherent incentive inasmuch as the contractor's liability is reduced for each failure eliminated. The "power" of the incentive depends on a number of complex factors, to wit: the length of the warranty, the contractor's ability to control certain types of defects, and the flexibility and capability to identify problems and institute corrective action. The prime advantages of the zero-defects warranty are innate simplicity and early identification of defects. The obvious disadvantage is the cost associated with the higher risk assumed by the contractor.

3.2.2 Expected-Failure Warranty

Another common form of warranty (also called "threshold warranty") defines a breach only when the number of failures exceeds a stated "threshold." This is a form of assurance warranty. The product must meet stipulated reliability levels. This "expected-failure" concept may also be applied to other performance factors. The warranty does not have a stated or implied incentive to exceed stated levels. The expected-failure warranty represents a reduced risk to the contractor inherent in the "buffer" number of failures or malfunctions before remedial action is required. This form of warranty recognizes, after all, that malfunctions will occur despite the best of design and manufacturing processes. It is difficult, however, to select an appropriate threshold. The principal disadvantage to the Government is the intensive data collecting, recording, and accounting that must be conducted whether or not the threshold of expected failures is ever broached and tangible benefit is received (unless the manufacturer is under contract to repair all malfunctions).

3.2.3 Systemic Warranty

Yet a third warranty form embodies a "systemic" concept. A "systemic defect" is one which occurs with a frequency, sameness, or pattern to indicate a logical regularity which exceeds predicted failure rates. When a systemic defect is detected, the Government presumes that all weapon systems produced under like circumstances are similarly defective and require replacement or correction on a fleet-wide basis. The systemic warranty, in effect, neatly delineates the Government-contractor relationship as "we'll repair the malfunction, you correct the deficiency." The principal advantages to the Government are reduced cost and avoidance of complicated reporting, tracking, and accounting requirements. All services have established quality deficiency reporting mechanisms which need not be duplicated for this reporting purpose. Also, in contrast to its sister warranties, the systemic warranty is more apt to treat a cause rather than a symptom. Under the other warranty forms, a contractor is prone to correct a malfunction with a part or assembly that will perpetuate the process until the warranty expires, whereupon the Government merely inherits the problem.

3.2.4 Defect-Free Warranty

The "defect-free" warranty directly relates to contract nonconformances rather than hardware failures, as do the failure-free and expected-failure warranties. The defect-free concept is based on the fact that nonconforming materiel might be delivered despite the efforts of both the Government and contractor. The Government may establish procedures for reporting and taking action when these nonconformances are discovered. The defect-free warranty concept preserves the contractor's obligation to deliver systems that conform to contract requirements beyond acceptance. It also recognizes that not all defects result in failures and not all failures result from defects. A single expiration date for all warranted systems delivered is used. This is necessary for systemic coverage and facilitates warranty administration because the procuring agency and contractor only need to know the contract number to determine if a warranty is applicable. Warranty markings and documents identifying warranted systems are not necessary. Defect-free warranties have little impact on the user since existing systems for reporting defective materiel are utilized to execute the warranty. For the procuring agency to execute the warranty when a deficiency report is submitted, the deficiency report need only identify the system, the nature of the deficiency, and the system serial number. Defect-free warranties can have both individual and population coverage. Each reported deficiency is processed in accordance with normal Quality Deficiency Report (QDR) processing procedures. Additionally, if a systemic defect becomes evident, then a systemic remedy becomes applicable. Since defect-free warranties do not change what the contractor is required to deliver and few additional administrative actions are required on the part of the contractor or Government, defect-free warranties are normally cost-effective. In structuring defect-free warranties, the program manager must elect an appropriate remedy, such as replacement, repair, or bill-back.

3.3 ASSURANCE VERSUS INCENTIVE WARRANTIES

The term *assurance warranty* is used when the primary intent is to assure that minimum design, quality, and performance levels are achieved. The Government is not seeking anything more than the contract specifies, and the warranty concept and terms and conditions do not provide any incentives for the contractor to do otherwise. This is the type of warranty envisioned by 10 USC 2403. Following the legislation of 10 USC 2403, there have been basically only two key changes in warranty practices:

- Application of warranties to weapon systems became mandatory rather than discretionary.
- Of the types of warranty coverage required under 10 USC 2403 (listed in Table 2-1), only the warranty for conformance to EPRs reflects a new, post-acceptance commitment. (Warranty coverage for conformance to design and manufacturing requirements is traditionally covered under some form of the inspection clause; the warranty for freedom from defects is usually covered under the inspection clause or correction of defects on warranty of supplies.)

The term *incentive warranty* is used for the type of warranty that provides incentives for the contractor to exceed minimum design, quality, or performance levels. For such a warranty, the contractor can adapt a strategy to merely meet the minimum performance levels. However, the warranty should be structured so that the risks of failing to achieve the minimum levels, or the potential profit associated with exceeding those levels, will induce the contractor to exceed minimum levels. This type of warranty may or may not meet the requirements of 10 USC 2403.

The distinction between the two basic forms can be illustrated by an example. Assume that a weapon system will be procured that has a field MTBF requirement of 1,000 hours. For the selected warranty period, the warranted weapon systems are expected to operate for a total of 200,000 hours. (This example assumes that the warranty period is the same for both the assurance and incentive forms of warranty. Generally, the warranty period for an incentive warranty is longer than that for an assurance warranty.) Therefore, if the MTBF requirement is met, the total number of expected failures is 200,000/1,000 = 200.

For an assurance type of warranty, the terms and conditions may state that all failures beyond 200 that occur during the warranty period must be repaired by the contractor at no additional cost to the Government. The contractor does not benefit from producing systems with better than a 1,000-hour MTBF.

Now let us consider an incentive warranty form for the same example. Suppose the contractor is to provide depot repair services for this equipment over the warranty period at a fixed price, which is based on the required MTBF of 1,000 hours or 200 expected failures. The contractor, aware of this pending warranty commitment, realizes that each failure that can be eliminated results in more profit. The contractor therefore has the incentive to invest in design, production, and quality assurance to reduce the number of future failures. In addition, there is an incentive to search for the existence of pattern failures and, if a systemic failure is observed, to develop a fix to reduce or eliminate such failures. This type of warranty is known as an RIW because of these incentivizing features.

Figure 3-1 portrays the relationship of the contractor's profit to the achieved MTBF for this example. For both forms of warranty, the contractor will suffer a loss for MTBF less than 1,000 - X, where X represents the decrease in MTBF from 1,000 hours "covered" by the warranty profit/risk dollars in the contract price. For the assurance warranty, the contractor's profit rises to the expected contract profit and remains there for MTBF equal to or greater than 1,000. For the incentive form of warranty, the profit continues to rise with increasing MTBF and, theoretically, is asymptotic to a value near the contract warranty price—the only costs incurred being for warranty administration and warranty data as MTBF approaches infinity.

Distinctions between assurance and incentive warranties are not always clear. Table 3-1 lists various procurement and deployment factors and their relationship to these two warranty types.

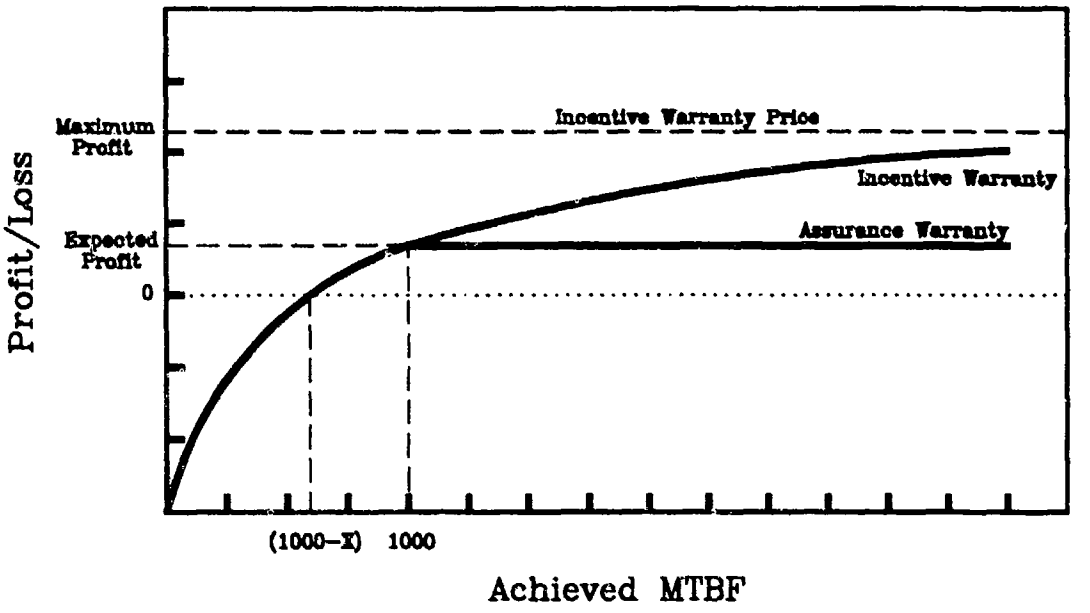

Figure 3-1: Contractor Profit

Table 3-1

ASSURANCE vs. INCENTIVE

FACTOR	ASSURANCE	INCENTIVE
Intent	Meet minimum performance levels	Exceed minimum performance levels
Price	May be minimal	May be significant
Duration	Limited—usually 2 years or less	May be extensive—usually 3 years or more
Administration	Generally moderate	May be complex
Technology	1) Well within state of the art or 2) So severely pushed that a limited warranty is realistic	Pushes state of the art. Employed to protect against failure and allows opportunity for growth
Contractor	Limited opportunity to control and improve performance	Significant opportunity to control and improve performance
Competition	May sustain competitive climate	May reduce competitive climate

3.4 WARRANTY REMEDIES

A warranty remedy is the action the contractor must take in the event the product does not meet the requirements stipulated in the warranty statement. Standard remedies are discussed in the following subsections.

3.4.1 Repair and Replacement

A defect may be corrected through a repair or replacement action. Typically, such a remedy would be applied to an individual-system defect as opposed to a population defect. If the contractor performs the repair or supplies the replacement, there is no additional cost to the Government; if the Government performs the repair or supplies the replacement, it may bill the contractor. The term "bill back" is used to describe this remedy. The amount or the method by which the amount is determined is generally specified in the contract. Normally, the bill-back amount cannot exceed the contractor's normal repair and replacement costs. Some procurement strategies, however, favor the inherent control of organic repair and bill back to contractor repair and replacement.

3.4.2 Price Adjustment

In some cases, correction of a defect may not be possible or practical, and the only remedy available may be to "equitably" adjust the contract price downward. In this sense, the amount of the adjustment must be commensurate with damages suffered by the Government. An example of such adjustment is the logistics support cost guarantee (LSCG). If a "measured" LSC (MLSC) is greater than the corresponding guaranteed value, the contractor may have to "pay" all or part of the difference through a downward adjustment in contract price. On the other hand, the contractor may share some or all of the potential savings if the MLSC value is lower than that guaranteed. It should be pointed out that the term "equitable adjustment" is relative—the contractor's perception may differ markedly from that of the Government. Conceptually, the term sounds much more benign than the process proves in reality.

3.4.3 Redesign

If a defect pertains to the whole population, warranty terms may stipulate a redesign. Above all other remedies, redesign offers the assurance that deficiencies will be corrected as opposed to malfunctions repaired. Such action is normally required when an EPR is not met. An example is the mean time between failure guarantee (MTBFG) for which the contractor must determine the cause of a low MTBF and design and implement a fix.

3.4.4 Other Remedies

Combinations of the above remedies may be used as well as other forms. Warranties that require contractor repair should have a specified turnaround time requirement. For instance, the warranty period on a weapon system could be extended one day for each

day the turnaround exceeds the specified value, although the administration becomes exponentially burdensome with such provisions. A consignment spares provision of an MTBFG is an example of another remedy form. Although such spares are used to maintain the pipeline temporarily, the warranty may stipulate that the consignment spares become Government property if the contractor cannot correct the low MTBF through redesign. If the Government requires the contractor to suit up for a consignment spares contingency, it is a safe bet that the Government has, for all intents and purposes, paid for the consignment spares anyway.

3.5 WARRANTY VARIANTS

Any warranty which meets the requirements of law and advances the weapons system program objectives should be a viable candidate for potential application. Appendix H contains a number of alternatives, some of which are combinations of alternatives, for quick reference (Reference 9). For each alternative, the appendix presents the following information:

- Objective
- Description
- Applicability
- Measurement

Four of the more commonly used warranties listed in the appendix are:

- Reliability Improvement Warranty (RIW)
- Mean Time Between Failures Guarantee (MTBFG)
- Availability Guarantee (AG)
- Logistics Support Cost Guarantee (LSCG)

Table 3-2 summarizes these four forms, which are discussed in the following subsections.

3.5.1 Reliability Improvement Warranty

The RIW has been used extensively in the past, particularly for electronic systems. The objective of RIW is to achieve acceptable reliability while providing the motivation and mechanism for reliability improvement. This is accomplished through a fixed-price contract provision for the contractor to perform repair for all covered failures during the warranty period. Presumably, the price paid for the warranty is based on reasonable costs to repair covered failures when the field failure rate is consistent with that specified or "expected." As before, if the warranty is for 200,000 operational hours and the Government expects a field MTBF of 1,000 hours, and if the contractor has provided equipment that meets this expectation, the number of failures expected to occur is 200,000/1,000 = 200. That number becomes the basis for negotiating a warranty price.

Table 3-2

SUMMARY OF FOUR INCENTIVE WARRANTIES

TYPE	OBJECTIVE	APPROACH	REMEDY	CONDITIONS
RIW	Achieve acceptable reliability. Motivate contractor to improve.	Under fixed price, contractor performs depot maintenance at least 2 years.	Contractor repairs all failures. Has option to implement no-cost engineering change proposals (ECPs).	Depot repairable units. Tolerable to reduced military self-sufficiency.
MTBFG	Achieve required field MTBF.	Contractor guarantees field MTBF. Measurements are made and compared.	If guaranteed value is not achieved, contractor must implement solution.	MTBF is appropriate parameter. MTBF is measurable.
AG	Achieve required operational availability.	System availability is measured in the field or through specials tests and compared to guaranteed values.	If guaranteed value is not achieved, contractor must implement solution.	Availability is appropriate parameter. Availability is acceptably measured.
LSCG	Control LSC.	Contractor "bids" model-generated target LSC. Same model is used to obtain measured LSC from measured field parameters. Values are compared.	Contract price adjustment. Correction of deficiency may be required.	Appropriate LSC model exists. Generally, special test program required to obtain measured values.

It is in the interest of the contractor to produce equipment with an MTBF greater than 1,000 hours if the incremental development or production costs to do so are less than the reduction in future warranty repair costs. The contractor, who also repairs all failures, has the opportunity to devote resources to detect systemic failures as early as possible. If a fix can be developed and implemented in time to reduce the number of future failures economically, the contractor will be inclined to do so (Reference 11). The terms and conditions of an RIW generally embody exclusions, failure-verification procedures, and turnaround time procedures.

RIW has been used in the past on such programs as the Navy F-14 hydraulic pump, Air Force F-16 avionics, and Army ARN-123 CONUSNAV radio. The RIW approach has required changes to support systems, but has proven to be administratively workable. The RIW warranty has been used more extensively by the U.S. Air Force than other services. The U.S. Navy, for example, prefers to specify reliability requirements "up front" rather than grow toward them down the road. Nevertheless, the RIW may be a consideration for requirements "on the leading edge" of technology wherein present capability and future sustainability converge.

3.5.2 Mean Time Between Failures Guarantee

An MTBFG provides a direct means for controlling the operational reliability of fielded systems. This is accomplished by specifying in the contract the MTBF to be achieved in the field, a means for measuring the operational MTBF, and actions to be taken if the measured MTBF is less than the guaranteed value.

MTBFG Values

Two approaches to determine MTBFG values have been used: the MTBFG value is specified in the request for proposal (RFP), or contractors bid an MTBFG value. If contractors must bid values, the RFP should specify a minimum value—one that is consistent with the system specification and development program. The bid value and the MTBFG price are potential source-selection factors.

A consideration regarding specified MTBF values is to allow for reliability growth. This is generally accomplished by designating an initial period over which no MTBFG is in force. Such a period will allow for stabilization of problems associated with initial installation and operation and for correction of initial production problems. A schedule of guaranteed values may then be used to "grow" the MTBF up to the final desired value. Thus, for the first six months of operation, there may not be any guarantee; for the second six months, the guaranteed MTBF may be equal to X; and for the next 12 months, the guaranteed value may be X + Y.

MTBF Measurement

The contract must specify how MTBF is to be measured. If a current military data system can support such a measurement requirement, that data system may be used. In most cases, current data systems will not be adequate and a unique data-collection process must be devised and instituted.

Generally, MTBF is defined as operating exposure divided by the number of relevant failures. Ideally, operating exposure is the number of operating hours or cycles of the warranted weapon system. In practice, this is difficult to obtain and pseudo-measures, such as platform hours (aircraft hours, for example), may have to be used. In some cases, a statistical sampling procedure using elapsed-time-indicator (ETI) readings has been used to calculate operating exposure (Reference 12). On the down side, there are recorded incidents where systems have spent an inordinate amount of time energized on the repair bench, ETI turning, while the warranty provisions clicked away during "down time."

MTBFG Remedies

In the event a measured MTBF value fails to meet the guaranteed value, the contractor may supply the following typical remedies:

- Engineering analyses to determine the cause of MTBF nonconformance.
- Corrective engineering design or production changes.
- Modifications of systems as required.
- Pipeline consignment (loaner) spares in accordance with a contractually specified method to support the logistics pipeline pending improvement in MTBF.

Past applications of MTBFGs have used a formula to determine a quantity of consignment spares that reflects the shortfall in pipeline spares as a result of lower than expected MTBF. Typically, a maximum penalty is specified to limit the contractor's liability. There must be an agreement on the disposition of consignment spares if and when MTBF improves. It is also possible to include a positive incentive if the MTBF exceeds the guaranteed value by a certain factor.

The MTBFG is best applied if the weapon system is under contractor maintenance (such as for an RIW) so that problems can be identified and remedied expeditiously. The weapon system under the MTBFG should be in production if a consignment spares provision is invoked; otherwise, this remedy may not be practical. The MTBFG, in conjunction with an RIW, can provide a method for assuring satisfactory or improved reliability performance (References 13 and 14).

Defects in Materials and Workmanship Versus MTBF Requirements

There is a potential conflict between a control on all defects in materials and workmanship and an EPR on MTBF. Suppose the stated MTBF requirement "allows" a certain number failures to occur for a stipulated number of hours of operation during the warranty period. The question of concern is whether the defects in materials and workmanship control applies to that certain number of failures. If the defects control is limited to those defects that existed "at time of delivery," then it is fairly clear that the two controls are not in conflict. The only difficulty in this case is "proving" that the failure was a result of a defect existing at time of delivery. The defects clause protects against initial quality problems, while the MTBF requirement is a reliability control for an accepted product.

If the time-of-delivery condition is removed, the conflict with an MTBF requirement may surface. This issue should be directly addressed to avoid further problems with implementation of the warranty.

3.5.3 Availability Guarantee

An AG is similar in concept to an MTBFG in that it focuses on a measurable population characteristic rather than on individual system failures. In this case, the characteristic is operational availability, which measures the system readiness state. An AG is most applicable for systems that are normally dormant or partially dormant, such as missile systems, but that have a high operational availability requirement. A form of an AG has been used for subsystems of the air-launched cruise missile. It may also be appropriate for continuously operating systems such as a radar warning system.

In its most elementary form, availability can be defined as

$$A = \frac{MTBF}{MTBF + MDT}$$

where

A = availability
MTBF = mean time between system failures
MDT = mean downtime (time to restore a failed system)

In this form, A can be interpreted to represent the proportion of time that the system is operational. Availability is influenced by two system characteristics: reliability and restoration capability. The latter characteristic is a function of maintainability and logistics factors.

In practice, an AG is implemented in a manner similar to an MTBFG. Availability values are specified in the contract. Periodic measurements of fielded systems are made to obtain operational availability statistics. If the measured operational availability is less

than the contractually guaranteed value, the warranty remedies are invoked—typically a requirement for the contractor to correct the deficiency and possibly to supply loaner (consignment) spares in the interim.

Availability Guarantee Values

Availability is a multidimensional characteristic. Infinite combinations of MTBF and MDT values can result in a given A value. For some applications, only a subset of such combinations may be appropriate; this must be recognized to establish the AG value. For example, one might specify an availability requirement of 0.95, provided that the system MTBF is at least 100 hours. It is also necessary to recognize that the downtime component of availability may involve elements that are not under contractor control, such as logistics administration time waiting for tools, test equipment, a mechanic, or a repair part. The guarantee value and corresponding measurement procedure should not penalize a contractor for negative factors for which the contractor is not at fault.

Availability Measurement

The availability measurement process can be complex and should be tailored to the specific application. For dormant systems, data from periodic check-outs, test launches, built-in test equipment (BITE) checks, and other-sources, such as special tests may be combined to yield a measured availability. For continuously operating systems, the ratio of up time to total time may be measured, a sampling approach may be used, or individual measurements of MTBF and mean time to repair (MTTR) may be combined to provide availability statistics.

Availability Guarantee Remedies

Remedies for an AG often take the same form as those used for an MTBFG; namely, the cause of low availability has to be corrected and consignment spares may be required in the interim.

3.5.4 Logistics Support Cost Guarantee

The LSCG is used when the main focus for control is logistics support cost (LSC). A target logistics support cost (TLSC) is established in the contract, reflecting the costs to support the guaranteed equipment. Appropriate statistics on fielded equipment are collected, usually through a special test, and the measured logistics support cost (MLSC) is calculated. The MLSC is then compared with the TLSC; if the MLSC is greater, a warranty breach has occurred, and specified remedies must be invoked. If the MLSC is less than the TLSC, a positive incentive such as an award fee may be applied.

LSCG has been used on such programs as the Air Force F-16 and the Navy F-18 (Reference 15). For the F-16, the LSCG approach was used on the complete aircraft

(less GFP), except for "high burner" avionics for which an RIW or RIW/MTBF was applied.

Target Logistics Support Cost

The TLSC is usually defined through use of a model that combines acquisition costs, reliability and maintainability (R&M), and support factors. Cost elements included in an LSCG are typically selected from the following cost categories:

- Hardware acquisition.
- Initial spares.
- Replenishment spares.
- Organizational, intermediate, and depot maintenance.
- Support equipment.
- Support of support equipment.
- Training.
- Data.
- Inventory management.
- Other miscellaneous factors.

The RFP should provide details on the model used to generate the aforementioned costs. It should include a set of standard factors, such as military labor rates and Government transportation times, and should specify the population size (the number of operational systems) and the number of life-cycle years to consider. Other factors, such as equipment costs and equipment MTBF and MTTR values, are proposed by the contractor and inserted into the model to yield the TLSC. Generally, the contractor does not guarantee individually proposed values unless explicit provisions are included for that purpose.

Logistics Support Cost Measurement

Computation of MLSCs usually entails implementing a special data collection system to collect statistics on the contractor-proposed values used to obtain the TLSC. These statistics, together with the same standard (default) values, are then inserted into the LSC model to yield the MLSC. As an example, for the F-16 program, a six-month special data collection effort was conducted at one operational base to collect reliability, maintainability, and logistics statistics.

Logistics Support Cost Guarantee Remedies

A number of warranty remedies are available. One option is to use a contract price adjustment provision where the contract price is reduced by an amount proportional to

the estimated support cost overrun. Another option is to invoke a correction-of-deficiencies clause in which the contractor must identify the causes of the overrun and then design and implement a fix. In some cases, a cost-sharing arrangement may be established. To provide positive incentives, there may be a provision that the contractor receives additional monies if the MLSC is less than the TLSC. This may be accomplished by a formula or, more typically, through an award fee process.

3.5.5 Comparison of Incentive Warranties

Table 3-3 summarizes the four incentive warranties with respect to a number of risk and implementation factors. The table also includes the assurance warranty (AW) as a point of departure. Comparisons are relative and represent generalizations.

Table 3-3

WARRANTY COMPARISON

FACTOR	AW	RIW	MTBFG	AG	LSCG
Warranty Period	Short	Mod/Long	Mod	Mod	Short/Mod
Contractor Pricing Risk	Low	Mod	High	Mod/High	Mod/High
Contractor Motivation for Improvement	Low	Mod	High	Mod	Low/Mod
User Risk of Not Achieving Objectives	Mod/High	Mod	Low/Mod	Mod	Mod
Administrative Difficulty	Low	Mod	High	High	Low/Mod
Enforceability Risk	Low/Mod	Mod	Mod	High	Mod/High
Warranty Services Provided by Contractor	Repair or replace warranty failures: redesign if necessary	Depot maintenance plus no-cost ECPs	Logistics assets if required plus no-cost ECPs	Logistics assets if required plus no-cost ECPs	Logistics assets if required plus no-cost ECPs

3.6 CONFORMANCE DETERMINATION

A maxim in developing an effective warranty is to ensure that means are available to determine whether the weapon system conforms to the warranty. When the warranty coverage refers to an individual weapon system, such as for a materials or workmanship defect, reference can be made to a specification and, if applicable, a particular test procedure. The test procedure, which may be the same as that used to perform final inspection before acceptance, is invoked if the contractor does not believe the warranty

claim is valid. A more difficult problem is faced when the warranty coverage refers to a system population, such as field MTBF or LSC. In such cases, the warranty clause must clearly specify the measurement methodology (procedures, equations, or data, for example) employed to verify that the weapon system conforms to the warranty conditions.

3.7 CONTRACTOR MOTIVATION ISSUES

To develop an effective warranty program, the program manager must look beyond the basic requirements of 10 USC 2403. Two ways of looking at a warranty program are as follows:

- Obligational viewpoint: Develop a warranty that will obligate the contractor if the product is not satisfactory, such as an assurance warranty.
- Motivational viewpoint: Develop a warranty that will induce the contractor to provide quality products, such as an incentive warranty.

Both approaches can be effective, either in isolation or combination. In many cases, contracting and administrative constraints will dictate the simplest warranty form. However, if the resources are available to develop and implement a warranty program from a motivational viewpoint, the likelihood of meeting or exceeding minimum requirements is enhanced. Proceeding with a costly warranty program will require that the procuring agency first conduct a complete cost-benefit analysis to justify the greater investment costs generally associated with incentive warranties. At this point it would be well for all concerned to remember that contractors do not have two separate products—one "with" and one "without." The overwhelming majority of contractors are going to exert their best effort to meet contractual weapon system requirements whether or not warranty contingencies are present. It is myth to believe that contractors universally employ manufacturing, assembly, and quality control standards that would otherwise be absent were it not for warranty provisions.

3.7.1 Contractor Reliability Motivations

Reliability is one of the principal system performance parameters that the warranty law addresses. Reliability differs from initial quality in the sense that it pertains to the long-term performance of the system—the probability that the system will perform satisfactorily throughout the mission—or the mean time between system failures.

The overwhelming majority of contractors have a positive attitude toward quality. Quality inspections are normally performed on all submitted products, and rejections result in added expense and reduced profit. Reliability, on the other hand, is more elusive: it cannot be measured up front and, in some respects, it does not offer immediate, positive inducement to a contractor. The slow passage of time is the determinant of reliability.

3.7.2 Other Warranty Motivations

There are motivations other than reliability that can be associated with a warranty. The warranty commitment forces the contractor to think seriously beyond just having the product accepted. Being involved throughout the warranty period may stimulate the contractor's concern for with maintenance, diagnostics, training, data, and other logistical support factors. For example, warranties have been written which stipulate that the contractor is not reimbursed for processing returned systems which test "ok" at the contractor's facility unless the percentage of such returns is very high. Since such processing is costly, the contractor may be motivated to improve the built-in test equipment, technical manuals, test equipment, or other elements associated with failure detection and verification.

Another example of a motivational factor concerns maintenance efficiency. If the contractor has to repair all warranted failures, it is important that there is an effective and efficient repair process. Such warranties have traditionally influenced the contractor to design for maintenance as well as reliability.

When the contractor views warranty as a potential profit source and a means to achieve a competitive edge, warranty "motivation" purposes are well served. Producers of quality systems need not add significant warranty contingencies or risk funds to their price, and they need not spend all of their warranty funds to fix a poor product. A warranty should be an added impetus to achieve and maintain a quality product. Likewise, all other things being equal, the lower the contract warranty price offered, the more the contractor stands behind the product by its own merits.

3.8 PRICE AND COST ISSUES

3.8.1 Warranty Price Experience

Since passage of the current warranty law, warranty price and cost have become emotional issues. Warranties were previously secured on a very limited basis—often for less than one year—and primarily provided coverage against latent defects. In such cases, the warranties were usually provided to the Government at little or no additional cost. The more extensive warranty forms, such as RIW, MTBFG, and LSCG, were used only for special cases, and the acquisition budget for the program usually included expected warranty costs.

The precise amount to expend on warranty as a percentage of total contract price is indeterminate. The basic question becomes: "Can the contractor justify the price?" Where the Government has benefit of historical data or information, outyear options should be the beneficiary of initial production runs. Also, warranty price might not be listed as a separate line item. While it is beneficial to look at disaggregated contract cost data, it is equally beneficial to weigh the contract in entirety.

3.8.2 Current Production Systems

The pricing risks should be minimal to secure a warranty for a weapon system in current production. The warranty experience on the previous lots provides data to both the Government and the contractor to assess risks and potential liability. For a satisfactory product, the warranty terms and conditions may be tailored to reduce coverage (decrease warranty duration from 36 months to 18 months, for example), thereby reducing warranty price and administration costs. On the other hand, if a problem has been encountered, the warranty terms and conditions may be tailored to help ensure an appropriate correction is made.

3.8.3 Warranty Payment

Warranty payment is usually made with delivery of the hardware, although a pro rata arrangement may be used for a longer-term warranty duration—particularly if some form of future contractor service is to be supplied, such as warranty data reports. If the warranty is a separate line item, it may be priced as cost per unit of delivered hardware or total cost under the contract. For the longer-term warranties, escalation clauses may be employed.

3.8.4 Government Warranty Costs

In addition to the warranty price paid, the Government will incur costs related directly or indirectly to the warranty. Direct costs include those for warranty development, administration, and those to obtain or provide special data, warranty training, in-plant warranty monitoring, and special transportation. Indirect costs include those related to increased sparing requirements because of longer pipeline times, decreased breakout and competition opportunities, and reduced self-sufficiency. As the total of the warranty price and the direct and indirect warranty costs may be significant, the acquisition activity must look to the potential savings induced by the warranty to determine if the warranty cost increment is justifiable. This process forms the basis of warranty cost-benefit analysis.

3.9 RISK ISSUES

There are evolutions in minimizing warranty risks:

- Integrate warranty considerations into acquisition strategy.
- Use program criteria and requirements documents to structure a supportive warranty.
- Structure the procurement strategy and the warranty terms and conditions to resolve the risk factors.
- Conduct adequate tests and evaluations.
- Perform warranty cost-benefit analyses.

A warranty is not undertaken without risk to both the Government and the contractor. In most cases, the risks can be mitigated through appropriate activities during the acquisition phases and through tailored terms and conditions. Well planned and integrated warranties need not cause serious disruptions of system deployment or threaten the viability of the contractor. This is not to say that problems have not occurred. However, warranties can be obtained for weapon systems that are workable and beneficial to both the contractor and the Government. The Government is "betting" that the penalty or incentive features of the warranty will be strong enough to ensure that EPRs will be met. The contractor is "betting" that the warranty money paid will remain as profit. Since good quality and performance can win the bets for both parties, this "win-win" characteristic is a warranty structure goal where the risks to both sides are acceptable. Table 3-4 lists possible risks associated with warranty procurements.

Table 3-4

WARRANTY RISKS

FACTOR	RISK
Characteristic Addressed Under Warranty	The "wrong" characteristic may be selected, thereby focusing effort incorrectly.
Price	It is difficult to estimate expected field performance which is a basic measure for realistic pricing.
Operational Factors	Field stresses may be difficult to estimate because of many unforseen circumstances.
Self-Sufficiency	Contractor repair, if part of the warranty, can reduce military self-sufficiency for wartime-critical items.
Equipment Design	Contractor may design equipment more suitable for meeting the warranty commitment than for meeting the military maintenance environment.
Transition	If required, transition from contractor maintenance to military maintenance can introduce serious administrative and logistics problems.
Administrative Complexity	Procurement and logistics procedures may have to be developed to implement the warranty effectively.

CHAPTER FOUR

WARRANTY SELECTION AND STRUCTURE

4.1 SELECTION FACTORS

The following subsections address factors related to acquisition, the system, and operation that can influence warranty selection and warranty terms and conditions.

4.1.1 Acquisition Factors

The following acquisition factors influence the selection and structure of an effective warranty:

- Development history: Detailed data available on the system should be used to determine potential warranty problems. Prediction and test data can help define quantitative warranty requirements.
- Small versus large buy: The larger the buy, the greater the potential risk to the contractor if warranty terms and conditions are not met. Generally, the severity and scope of the warranty terms varies as the procurement quantity increases. For a small buy of large, expensive items, the warranty duration may be administered on an item-by-item basis. For a large-quantity buy, trying to manage warranty duration on an item-by-item basis may evolve into disproportionate administrative problems. Accordingly, warranty duration on a population basis, such as a single end date for all systems, is recommended. While it might be desirable to glean every potential minute's worth of warranty out of weapon systems sitting in storage or prepositioned programs, it is often impractical from an administrative standpoint.
- State of the art: The greater the technological challenge, the more difficult it is to structure a fair warranty at an equitable price. However, it is the technological challenges which most merit warranty consideration. It makes little sense to spend precious resources warranting that which does not need warranting. EPRs of weapon systems that "push" the state of the art are prime candidates for warranty.
- Competition: The degree of competition affects warranty price and contractors' enthusiasm to undertake or bid warranties with some risk. Without competition, it is generally better to impose warranty requirements rather than have a sole-source contractor bid. Warranty terms and conditions should not inhibit plans to compete future production contracts. For example, use of an RIW rather than organic maintenance may be inappropriate if future production contracts are to be competed.

4.1.2 System Characteristics

The following system characteristics affect the selection and structure of an effective warranty:

- Electronic versus mechanical: Many electronic systems exhibit relatively constant failure rates, which makes warranty duration a less important factor than for mechanical systems which wear out in proportion to time and use. Given a limited historical database, there will generally be more confidence in a warranty analysis of electronic systems than in an analysis of mechanical systems. Electromechanical characteristics are therefore important considerations for warranty duration and reliability prediction.
- Transportability: Should the warranty be so structured as to require contractor repair, the ability to economically and expediently ship failed systems/components requires consideration. Neither weapon systems bolted to a ship nor orbiting in space are transportable; obviously, a warranty remedy involving contractor in-plant repair is not feasible. Weapon system "ruggedization" is another factor in developing warranty terms and conditions that require transporting systems to another facility.
- Field testability: The ability to reliably determine whether or not a weapon system has failed is important for maintenance concept and warranty integration. If adequate equipment or procedures are not available to test weapon systems, then a significant number may be sent to the contractor for warranty action which, in fact, exhibit no-evidence-of-failure. This can be costly if the contractor can charge for processing non-failed systems.
- Warranty markings and seals: Ideally, warranted weapon systems/components should be clearly marked with appropriate warranty data and instructions. Markings on shipping crates and boxes contribute little. Likewise, markings which are obscured from plain view are of little use. If a weapon system or component cannot be suitably marked, or if it cannot be protected against unauthorized maintenance through seals or other controls, warranty terms and conditions should be appropriately adjusted. The Government should, in any event, retain the discretionary right to break any seal to take necessary corrective action.

4.1.3 Operational Factors

The following operational factors affect the selection and structure of an effective warranty:

- Acceptance-employment cycle: The length of time from weapon system acceptance until placement into service should be factored into the warranty duration. Acceptance typically occurs at the contractor facility with the signing of a DD Form 250 by a Government representative. Placement into service may

occur months, even years, later as weapon systems wind their way through shipping, inventory storage, and distribution cycles en route to actual employment. Either the average "transit" period can be added to the length of the warranty, or the warranty can be definitized to commence upon employment rather than acceptance. The latter can be infinitely more difficult to administer in the absence of on-equipment activity meters or indicators. The U.S. Army Tank-Automotive Command has employed "failure free to handoff" followed by systemic warranty provisions. This concept ensures that gaining commands (users) receive their combat vehicles free of all defects (regardless of the date of Government acceptance) and subsequently safeguards long-term EPR compliance.

- Operating cycle: Weapon systems may be employed only once, such as a missile; intermittently, such as an aircraft; or continuously, such as a warning radar. Such types of usage affect reliability performance parameters as well as measurement criteria for success or failure in field use. For one-shot usage, success probability is the most applicable reliability parameter; for intermittent usage, MTBF may be more appropriate; and for a continuously operating system, operational availability could have overriding importance.
- Existing military maintenance capability: If military maintenance capability already exists, a warranty necessitating a contractor to establish a repair facility is not likely to be cost-effective. This does not rule out alternative forms of remedy that do not require contractor repair facilities.
- Performance measurement: The ability to measure performance parameters is critical in establishing EPRs. While elapsed-time-indicators and meters on weapon systems may be used to record operational usage, maintenance records may also be used to record failures as well as process warranty claims. In some cases, special data collection methods may have to be employed or special operational tests conducted. As a general guideline, however, the probable success of a weapon system warranty program is inversely proportional to the efforts involved in determining whether or not a breach has occurred.
- Pipeline factors: The transportability of the weapon system, length of the pipeline, sparing level, and cost of spares all influence the maintenance concept of the weapon system under warranty. Government repair using bill-back procedures may be a viable option should contractor repair prove unsuitable because of pipeline factors.
- Self-sufficiency: Warranty remedies using bill-back procedures may also be appropriate in cases where criticality or preference dictates military maintenance.
- Transition: Termination of the warranty can have momentous consequences. Considerable thought should be given to a one-time transition over a phased transition, especially if the contractor performs depot-level maintenance.

4.2 WARRANTY ALTERNATIVES

The following sections identify alternatives for consideration in structuring a warranty.

4.2.1 Assurance Versus Incentive Warranties

Basic warranty functions were previously introduced. The assurance warranty assures the Government that minimum performance and quality requirements are satisfied. An incentive warranty entices the contractor to exceed contractual requirements.

The degrees of coverage and commitment separate the assurance warranty from the incentive warranty. Figure 4-1 provides a decision algorithm to aid in choosing between the two. Although developed under a Navy-sponsored research study (Reference 16), the algorithm has universal application. The first question on the figure indicates that the Navy has a standard approach to ship warranties. It is asked to determine whether a warranty involving contractor repair is feasible. The algorithm is based on the premise that an incentive form of warranty is most applicable when all of the following conditions exist:

- Money is available for extended warranty coverage.
- There is a need to improve field performance and there is an opportunity to do so.
- The contractor has significant control of the system capabilities before deployment and can maintain such control during deployment.
- The warranty period can be made long enough to influence the contractor (more than two years).
- An incentive warranty will not seriously erode plans for future competition.
- Warranty terms and conditions can be written to provide adequate compliance determination and remedies.

Not all these conditions may hold for any one program. Incentive warranty factors in the algorithm denote when condition(s) are violated. These factors are denoted by D (dollars), P (period), M (missile or ordnance), S (ship, ship system, or satellite), and R (repair by contractor).

4.2.2 Systemic Warranties

The systemic warranty embraces the notion that the Government will correct the malfunction, but the contractor will correct the deficiency. It minimizes internal Government administration requirements and can utilize established information (supply demand history) and quality reporting systems (Service Reports (SRs), QDRs, and Equipment Improvement Recommendations (EIRs), for example). It is linked to potential redesign and therefore benefits from long-term solutions rather than short-term fixes.

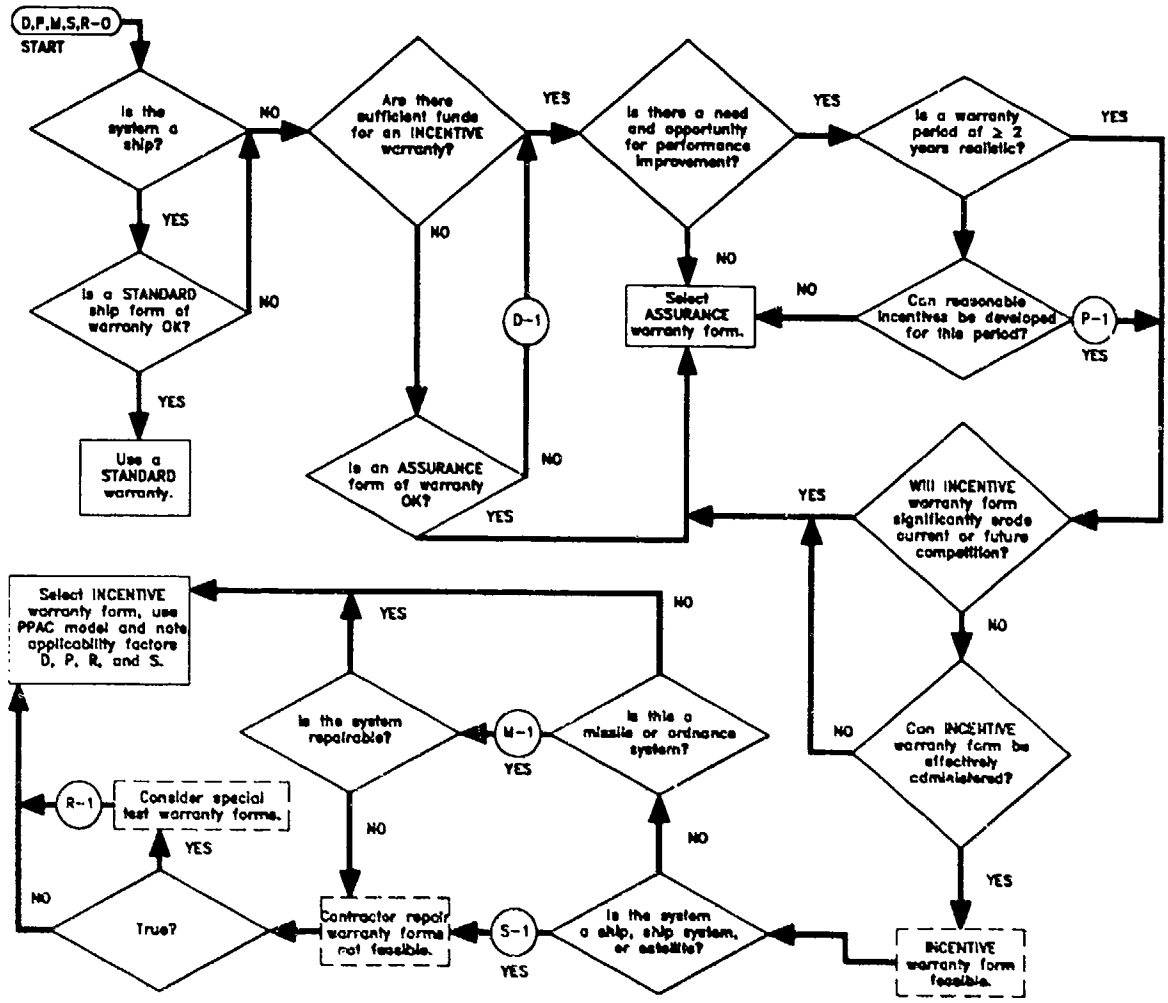

Figure 4-1: Warranty Decision Algorithm

4.2.3 Individual Versus Population Controls

A warranty can be placed on an individual system, the population of systems, or both. For example, the F-15/F-16 aircraft engine program employed controls on specific fuel consumption and thrust for each individual engine, but had an aggregate shop visitation rate for the engine population. Normally, the warranty coverage pertaining to defects in materials and workmanship applies to individual systems. Coverage of design and manufacturing requirements and also of EPRs may apply to either the individual system or the population. Design problems are obviously related to the entire population.

In terms of controlling reliability, an MTBF guarantee usually applies to a population of weapon systems or equipment. However, it is possible to apply such a guarantee to individual weapons. For example, a contractor may supply several communications satellites and provide guarantees as to the number of communications channels available on each individual satellite.

The type, quantity, and cost of the warranted weapon system will often dictate whether population or individual-system coverage is preferable. Large buys of small systems, such as avionics systems, are often more appropriate for population coverage, while small buys of large systems, such as command, control, and communications systems, are more amenable to individual-system coverage.

4.2.4 Special Tests Versus Operational Performance Monitoring

Means to determine conformance of actual weapon system performance to EPRs must be identified. Two approaches are:

- Special operational testing: The contract specifies a test to measure one or more parameters to determine conformance to the EPRs.
- Operational performance monitoring: Data is collected during normal operations and used to calculate relevant operational statistics for comparison to the EPRs.

The two approaches may be mixed. To discover and correct defects early in the production or deployment phase, testing or monitoring should begin as soon as effective procedures can be implemented. Use of special test procedures allow for direct and accurate measurement of characteristics of interest. However, because of the high cost, such tests are generally of a short duration and the data obtained therefrom may not enjoy a high level of confidence. Performance monitored during normal usage allows for an infinitely greater sample size, but is invariably labor intensive, expensive, and still subject to measurement error.

4.3 WARRANTY TERMS AND CONDITIONS

This section is designed to help program managers develop warranty terms and conditions that are consistent with program objectives as well as meet the requirements of 10 USC 2403. Standard clauses are presented within the major categories of warranty statement, contractor obligations, and Government obligations. This method of presentation is used to ensure that program managers think about the warranty structure rather than simply plagiarize an existing warranty. Even with this approach, users may tailor the clauses or develop new ones to fit the acquisition, system, operational conditions, and service policies peculiar to the procurement.

The following subsections present and discuss sample clauses for various parts of a typical warranty. In practice, warranty statements can be written to combine a number of such parts. For example, the following paragraph covers (1) item identification, (2) coverage, (3) remedy, and (4) duration:

> The contractor warrants that line items _____ [1] are free from defects in materials and workmanship at time of acceptance [2]. The contractor shall, at no additional cost to the Government, repair or replace any items with such defects [3] discovered within _____ months from the acceptance [4].

4.3.1 Warranty Statement

The following subsections present various alternative clauses that stipulate the basic coverage features of the warranty.

4.3.1.1 Precedence of Warranty Over Inspection/Acceptance

Military warranty clauses should be very specific to ensure that Government inspection and acceptance does not void or dilute the warranty coverage. A statement similar to the following frequently appears early in a warranty provision:

> Notwithstanding Government inspection and acceptance of supplies and services furnished under this contract or any provisions of this contract concerning the conclusiveness thereof, the contractor warrants that items [names or contract line item numbers (CLINs)] will meet the conditions specified below.....

4.3.1.2 System/Equipment Identification

The warranty terms and conditions must clearly delineate the systems or equipment covered. This can be accomplished by referencing specific contract line items or defining one or more terms that are then used throughout the warranty provision. In addition, any items of hardware or software that are specifically excluded should be noted.

Line Item Reference: The most commonly used form is reference to specific contract line numbers to define the items covered under the warranty:

> This warranty covers contract line items [0001AA] through [0001AF] and each component thereof.

Line Item Reference, Including Replenishment Items: This is similar to the above, except that systems installed during the repair process are also covered:

> This warranty covers line items [0001AA] through [0001AF] and each component thereof, including items subsequently installed by either the Government or the contractor to correct a defect.

System Definition: A term is defined to use in the warranty in a general way to refer to the systems covered:

> The term "system" [vehicle, computer, or aircraft, for example] as used herein refers to the highest-level end item furnished under this contract.

System Definition with Breakdown Structure: This extends the system definition approach. The following example is for an engine warranty:

> Engine: The word "engine" as used herein means the complete engine assembly.

Module: The word "module" as used herein is a major segment of the engine that can be changed at the intermediate level. The following are modules: inlet, fan, final drive, accessory gearbox, core.....

Component: The word "component" as used herein means an accessory or component as listed in Table_____.

Part: The word "part" as used herein means those individual items delivered under this contract as part of an engine and not included in the above definitions.

4.3.1.3 Design and Manufacturing Control

This clause covers defects in design and manufacturing as required by 10 USC 2403. If deemed necessary, the definitions section of the warranty can define design and manufacturing requirements as stipulated in DFARS Subpart 246.7.

Standard Design and Manufacturing Control: The following is a standard clause for ensuring conformance to design and manufacturing requirements:

> The contractor warrants that line items will conform to all design and manufacturing requirements specifically delineated in this contract [or reference applicable sections] and in any amendments thereto.

Government-Furnished Property Exclusion: Normally, Government-furnished property, equipment, or material is not covered in the same way as contractor-furnished equipment. The following clause limits the contractor's liability to GFP installation, modifications, and other work:

> With respect to Government-furnished property, the contractor's warranty shall extend only to its proper installation so as not to degrade the Government-furnished property performance unless the contractor performs modifications or other work on such property, in which case the warranty shall extend to such modification or other work.

4.3.1.4 Defects in Materials and Workmanship Control

This clause covers defects in materials and workmanship as required by 10 USC 2403.

Standard Defects in Materials and Workmanship: The following clause restates the law:

> The contractor warrants that line items provided under this contract are free from all defects in materials and workmanship at the time of acceptance or delivery [applicable specifications or contract provisions may be referenced].

Note that this clause ties defects in materials and workmanship to the system's condition at time of delivery or acceptance—it controls latent defects. If a defect is discovered during the warranty period, a dispute might arise as to whether the defect in fact existed at the time of delivery or acceptance. The phrase "at time of acceptance or delivery" may

be deleted to avoid disputes. With this deletion, all failures resulting from defects during the warranty period are covered. This may have contract price implications.

Coverage of All Defects, Whether at Time of Delivery or Not:

> The contractor warrants that line items [CLINs] provided under this contract are free from defects in materials and workmanship and will remain free from such defects for a period of _____, starting from _____.

Presumption of Defect at Time of Delivery: To reduce the chances for disputes without broadening the coverage as much as the statement above, a statement such as the following can be used to place the burden of proof on the contractor:

> It is presumed that all defects in materials and workmanship that occur during the prescribed coverage period existed at the time of delivery [or acceptance], unless the contractor can present to the Government clear and convincing evidence otherwise.

Coverage of All Removals, Including Items That Test Good: Sometimes systems that are sent back to the contractor for warranty action will exhibit no-evidence-of-failure at the contractor's facility. One way to place all responsibility on the contractor is to include all removals as part of the warranty coverage, as follows:

> Any warranted items removed from the system on the basis of a malfunction indication in accordance with applicable test equipment and/or technical publications shall be considered defective, although tests at the contractor's facility reveal otherwise.

4.3.1.5 Systemic Defects

Specific language is necessary to define a systemic failure and contractor responsibilities.

> The term "systemic defect" as used herein is a classification of defects which occurs, or may occur, with a frequency, pattern, or sameness to indicate a regularity of occurrence which exceeds predicted failure rates and would justify multiple system corrective action or excessive failure reported from field users. These reports will consist of [Service Reports], [Quality Deficiency Reports], [Equipment Improvement Reports].....and [Reports of Discrepancy]. The term "predicted failure rate" as used herein means the failure rate established in the [Provisioning Master Record] at the time of [First Unit Equipped] When a systemic defect is realized, the Government may assume that all systems produced under like circumstances are similarly defective and require their replacement or correction at the Government's discretion dependent upon.....

Care must be taken to ensure the failure factor at First Unit Equipped is extracted and documented.

4.3.1.6 Essential Performance Requirements

This section of the warranty differentiates 10 USC 2403 from earlier warranty doctrine. It is primarily designed to ensure that the deployed weapon system performs as specified.

Delineated EPRs: The DFARS as well as military services' policies direct that only selected "essential" requirements be included. Thus, use of a statement such as "the contractor guarantees that all performance requirements in this contract will be satisfied," is not advised. The costs to monitor and administer such a "global" warranty more than outweigh the benefits derived. A more appropriate approach is as follows:

> The contractor guarantees that, for the time period specified, designated line items will conform to the essential performance requirements, which are delineated as follows:
>
> | Line Item | Essential Performance Requirement |
> |---|---|
> | L-1 | EPR-1 |
> | L-2 | EPR-2 |
> | . | . |
> | . | . |

In many situations, reliability may be the appropriate top-level parameter to personify the major performance requirement. Reliability represents the capability of the system to perform satisfactorily. In a universal sense, reliability can embrace catastrophic failure, such as short circuit of an electronic module, as well as design or performance failure, like the inability of a radar to locate or track a target.

The parameter frequently chosen to measure reliability is MTBF or similar measures such as mean time between corrective maintenance actions. Sample clauses in which a reliability-related parameter is used as the EPR are presented below.

Mean Time Between Corrective Maintenance Actions—Individual System: The following provides a control on MTBF for each delivered system and is applicable for small buys of very large systems:

> The contractor guarantees that each [XYZ] system will maintain a mean time between corrective maintenance actions of _____ hours for the period specified in paragraph _____.

MTBF Control of Population: For smaller systems, it is usually better to place the reliability control on the population of systems:

> The contractor guarantees that the MTBF for the population of all delivered systems will be _____ hours when measured in accordance with the procedures delineated in paragraph _____.

Missile Storage Failure Rate: For a missile, a storage failure rate may be used as a reliability parameter:

> The contractor guarantees that the average storage failure rate of the [XYZ] missile shall be no greater than _____ throughout the period of this warranty.

Other reliability-related measures for missiles that have been used include availability, alert reliability, captive-carry MTBFs, storage reliability, and pre-launch reliability. Note that any EPR may vary over time. In several programs where MTBF was an EPR, reliability growth was incorporated. Thus, if the final MTBF of a system is to be 100 hours and there are three warranty measurement periods, it may be reasonable to require a 75-hour MTBF for the first warranty measurement period, 90 hours for the second period, and 100 hours for the final period. For some systems a degradation may actually be appropriate, such as for missile storage failure rate or for reliability levels of mechanical systems.

Engine Performance Parameters: Engine warranties provide good examples of EPRs that may not specifically relate to reliability. For example:

> The contractor warrants that the performance of each engine delivered, for the period specified, shall not be less than [95] percent of the intermediate thrust as set forth in specification [ABC] and shall not exceed [104] percent of the intermediate fuel consumption as set forth in specification [DEF].

Unclear, ambiguous statements regarding a performance requirement, such as the one below, should be avoided:

> Each system will be serviceable in accordance with the procedures specified in applicable technical orders and maintenance manuals.

The definition of "serviceable" is uncertain. Such a broad requirement can lead to definition problems and warranty disputes if maintenance problems with the system arise. Rather than cite technical orders and maintenance manuals as references, involving hundreds of pages, specific higher-level parameters should be identified for warranty coverage. Mean active repair time, which can serve as a surrogate for "serviceability," is an example.

Failure Threshold: For an assurance form of warranty in which the contractor is liable only for failures that exceed a threshold, a typical clause is:

> A threshold number of _____ valid warranty failures of depot-reparable parts is established during the specified warranty period. The contractor shall be liable for the repair/replacement costs of all valid warranted failures that exceed this threshold number during the warranty period.

4.3.1.7 Warranty Duration

The period of the warranty is a predominant element. Warranty cost, incentives, administrative factors, investment decisions, risks, and other factors are all keyed to duration. The goal is to incorporate a warranty period long enough to prove the quality of the weapon system in field operations. The elapsed time between acceptance and fielding should allow for normal delays attendant to transportation, integration of Government-furnished systems, and storage. After fielding, the warranty period must be

sufficiently long to validate the substantive quality of the weapon system and the integrity of the manufacturing process. As a general guideline, this period should, at a minimum, be somewhere between 12 months and 10% of the weapon system life. The duration of a warranty can be expressed in many ways, including the following alternatives:

- Duration applies to individual weapon systems versus lots.
- Duration starts with delivery, acceptance, handoff, installation, or some other event.
- Duration is in terms of calendar time, operating time, or a combination (whichever comes first).
- Warranty period can terminate early or be extended, depending on the weapon system's performance.

Sample clauses follow.

Calendar Period—Population:

> The duration of this warranty shall be for [24 months], starting with acceptance of the first system delivered under this contract.

Calendar Period or Operating Hours—Population:

> The duration of this warranty shall be for [24] months, starting with delivery and acceptance of the first aircraft under this contract, or [20,000 total aircraft flying hours], whichever occurs first.

Calendar Period—Individual System:

> Each system delivered shall be under warranty for a period of [24 months], starting with the system's date of acceptance.

Calendar Period—Tied to Last Delivery:

> The period of the warranty means the period of time running from the date of acceptance of the first system delivered under this contract until [12 months] after the date of acceptance of the last system delivered under this contract.

Operating Time—System Basis, Using a Run-Time Meter:

> The warranty period for each delivered system shall commence upon acceptance and continue until the end item has accumulated [400 hours] of operation. The hours of operation will be measured by a [run-time meter], which records operating time when power is applied.

It is possible to exclude run-time accumulation when the system is returned to the contractor for repair, but procedures must be established and can generate significant record keeping and monitoring requirements.

Multiple Options—For Warranty Termination:

> The warranty period shall extend from date of acceptance by the Government to whichever of the following first occurs:
>
> (1) One year
> (2) Accumulation of 850 miles
> (3) 175 hours of operation
> (4) 300 rounds fired

Varying Periods—Different End Date for Different Coverages:

> The contractor's obligations under this warranty clause apply (1) with respect to the performance guarantee, only to defects discovered within [6 months] after acceptance; and (2) with respect to the design and manufacture and materials and workmanship guaranties, only upon discovery of any breach of warranty within [12 months] after acceptance.

Extension of Warranty Period: For warranties on major weapon systems, it may be reasonable to extend the warranty period if a warranty breach causes a serious disruption of service. A typical clause of this type for a ship states:

> The guaranty period for each vessel shall be extended by the time during which such vessel is not available for unrestricted service by reason of any defects for which the contracting officer shall determine the contractor to be responsible.

Normally, warranty end dates for non-major weapon systems should not be extended in such a manner. The cost and administrative burden imposed—especially if a single end date was used initially—will more than outweigh the benefits. Control on turnaround time of non-major weapon systems returned to the contractor for warranty action can be invoked to adjust for lost use.

Clarity is important when specifying duration. The following clause, for example, can be interpreted several ways and is therefore not recommended:

> For [12 months] after acceptance by the Government, all systems shall _____.

Does the 12-month period start with each system, the first system, or the last system?

Carry-On Warranty: In most cases, due to excessive administration costs, it is advised that repaired/replaced components within a warranted system assume the remaining warranty of the original system, rather than reset the warranty clock (carry-on warranty) for these components.

Table 4-1 summarizes various warranty duration alternatives using operating time as the primary usage parameter.

TABLE 4-1

DURATION ALTERNATIVES

DURATION	ADVANTAGES	DISADVANTAGES
Fixed Calendar Period for All Units: All units are warranted for a fixed calendar time at the end of which all units go off warranty. The actual amount of warranty coverage for individual units will vary and the user must transition from warranty a single time. Contractor failure and risk exposure will depend on the utilization rate.	Simplest to administer.	Units receive varying amounts of warranty coverage. A sudden shift from contractor to military support may be disruptive. If units are not operated, value will not be received for prepaid warranty expense unless special adjustment provisions are made.
Fixed Calendar Period for Successive Production Lot: The warranty on all units within a production lot expires at a fixed time, but that time varies between production lots. This approach permits an essentially uniform amount of coverage for each unit, but results in a situation in which some field units are under warranty and some are not. This may be administratively unacceptable, but it does ease any transition problems. Contractor failure and risk exposure will depend on the utilization rate.	Permits incremental shift in support. Units receive more nearly equal warranty coverage.	Confusion may occur regarding disposition of a failed unit. If units are not operated, value will not be received for prepaid warranty expense unless special adjustment provisions are made.
Total Operating Hours for Individual Units: All units are under warranty until a total operating-hour level is reached. This type of coverage reduces uncertainty in pricing the warranty with respect to failure exposure, but the date for warranty termination is open-ended. Coverage on individual units will vary and a means for measuring total operate hours must be established.	Assures Government will receive full value of warranty cost.	More difficult to administer than fixed calendar period. Contractor may be liable for an extended period if operational usage is far below expectation.
Operate Hour or Calendar Time for Individual Units: The warranty on each unit expires after a specific number of operate hours or calendar time is reached. This approach provides uniform coverage and the most information for warranty pricing, but it is administratively cumbersome and might be appropriate for only warranty on such items as large, fixed ground equipment.	Limits time liability for contractor.	Requires individual-item operate-time measurement. Most complex administration.
Total Operate-Hours or Calendar-Time for All Units: This type of coverage provides for a single end time and limits contractor liability. While time to transition from warranty is not completely specified, it is more predictable than just total operate-hour control.	Limits time liability for contractor.	Complex administration. Value may not be received if time expires, however, may be minimized if coupled with an operate-time adjustment. Requires fleet operate-time measurement

4.3.1.8 Conformance Determination

The warranty terms and conditions must be absolutely clear regarding how conformance to the stipulated requirements is verified. Some written warranties have no specific clause regarding conformance determination, particularly with respect to defects in either materials and workmanship or design and manufacturing. Sometimes reference has been made to applicable technical orders or maintenance manuals. The implication of not having a specific verification procedure is that a weapon system returned for warranty

correction is presumed to be defective. If the contractor disagrees, the "disputes" clause of the contract is invoked. To minimize potential disputes, it may be prudent to either state a presumption of failure and place the burden of proof on the contractor, or specify a failure-verification procedure. Examples follow.

Presumption of Failure:

> It is presumed that all weapon systems returned for a defect in materials and workmanship or in design and manufacture are covered by this warranty, unless the contractor can present the Government clear and convincing evidence otherwise.

Specified Verification Test Procedure:

> Systems returned for warranty correction are presumed to be defective, unless the contractor can show otherwise, using the applicable test procedures specified in document [XYZ].

Reference to Special Test with Contractor Witness Privileges: For the more complex performance guarantees such as mean time between corrective maintenance actions, the warranty must include measurement or verification procedures. For such warranties as a logistic support cost guarantee or an availability guarantee in which special test procedures are required, the conformance clause can be quite complex. A general statement used to indicate a special test to verify conformance is as follows:

> During the period specified in paragraph _____, the Government will conduct an operational countdown test in accordance with the procedures specified in document [XYZ] in order to verify conformance to essential performance requirements. The contractor may witness such tests at no additional cost to the Government. The contractor shall be given notice in adequate time to send representatives to the test site.

MTBF Guarantee—Example Using a Standard Data Collection System: If an MTBFG or similar control on a population performance measure is to be used, the measurement or calculation procedures must be stipulated:

> MTBF will be calculated every six months, starting _____. The MTBF calculation formula is:
>
> $$\text{MTBF} = \frac{\text{total flying hours over the 6-month period}}{\text{total number of valid warranty failures during the 6-month period}}$$
>
> The [XYZ] data system shall be used to obtain the flying-hour data for the population of the [ABC] aircraft. All systems repaired or replaced under this warranty during the measurement period shall constitute the denominator of the above equation.

MTBF Guarantee—Special Verification Test: Sometimes a special test is conducted for MTBF or some other measure:

> A verification test (VT) shall be conducted jointly by the Government and the contractor to determine conformance to the MTBF guarantee requirement. The test will be based on plan

[XYZ], agreed to by both parties. The MTBF formula will be total cumulative hours on the systems in the test divided by the number of observed system failures.

4.3.1.9 Exclusions

Warranty exclusions are necessary to ensure contractor liability only for defects or failures that are under, or should be under, contractor control. Failure of a complex electronic device resulting from a fall off the back of a delivery truck should not be the responsibility of the contractor unless the contractor was also responsible for the delivery. On the other hand, there is a grave danger that general or ill-defined exclusions, such as "not used in the manner intended," may offer a contractor a escape that proves overly inviting. It is better to be specific.

Specific Exclusionary Clause:

The contractor shall not be liable under the terms of this warranty for any failures that occur as a result of [list of exclusions].

Specific appropriate exclusions include failures caused by the following:

- Accidents.
- Acts of God.
- Combat damage.
- Fire or submersion.
- Foreign-object damage.
- Government misuse, mishandling, repair, or installation not in accordance with prescribed procedures.
- Nonapproved storage, crating, or packaging.
- Sabotage or vandalism.

Misuse or Mistreatment Exclusion—Tie-In to External Physical Damage: Excluding failures occurring as a result of misuse or mishandling seems reasonable, but verification that such events occurred is often difficult, if not impossible, to obtain. A means of handling this is as follows:

The contractor shall not be obligated under these warranty provisions for:

(1) Repair of external physical damage caused by accidental or willful mistreatment by Government personnel.
(2) Repair of internal physical damage [not including electrical damage] that, in the determination of the Government, has been caused by accompanying external physical damage due to mistreatment.

Third-Party and Consequential Damages: It is Government policy to exclude the contractor from liability for third-party damage and consequential damage:

> The warranty provisions do not cover liability for loss, damage, or injury to third parties, or consequential damages.

4.3.2 Contractor Obligations

This part of the warranty contains the contractor obligations for warranty implementation. The main obligation is the remedy taken in the event of a breach. Generally, there are other clauses related to management, data, turnaround time, and storage.

4.3.2.1 Remedies

As indicated in the DFARS guidance, the three basic remedies are:

- Contractor implements a corrective action (repair, replace and/or redesign).
- Contractor pays costs reasonably incurred by the Government in taking necessary corrective action.
- Equitable reduction in contract price.

Correction of a Defect—Government Options: The following correction clause gives the Government the option of using any of the standard remedies:

> In the event of a breach of the contractor's warranty against defects in materials and workmanship or design and manufacture, the Government may, at no increase in contract price:
>
> (1) Require the contractor to repair or replace the defective or nonconforming supplies.
> (2) Require the contractor to furnish the materials or parts and installation instructions required to successfully accomplish the correction.
> (3) Equitably reduce the contract price if both options (1) and (2) are not elected.
> (4) Bill back to the contractor for the cost of repairs effected by the Government.

It is possible that two or even all three of these remedies may be invoked—generally at the option of the Government.

Correction of a Defect—Contractor Repair/Replace: A typical clause involving contractor repair or replacement of a defective system is as follows:

> In the event a defect in materials or workmanship occurs as stipulated in paragraph _____, the contractor shall repair or replace such parts as necessary to restore the system to a satisfactory condition [repair test verification procedures may be referenced]. Each such corrective action shall be performed within _____ days of receipt of the defective system at the contractor's facility.

Whenever possible, warranty clauses should refrain from use of "promptly" to control the turnaround time. A contractor should be afforded a "reasonable" period to accomplish corrective actions.

Average Turnaround—Liquidated Damage Assessment: Instead of a turnaround on each defective system, a control on all such systems over a specified period (an average turnaround) may be more appropriate:

> Turnaround time shall be defined as the time from receipt of a defective system at the contractor's facility for corrective action to the time the corrected system is ready for shipment or storage. The average turnaround shall be measured for [six-month] periods for all returned systems. If average turnaround in any measurement period exceeds _____ days, liquidated damages shall be assessed equal to (the number of systems returned during the period) x (the excess in average turnaround) x ($_____).

Instead of a monetary liquidated damage assessment for excess turnaround time, assessments for additional spare systems or an increase in warranty period duration may be stipulated.

Government Correction of a Defect, Bill Back to Contractor:

> The Government may provide the replacement parts for the defective systems though its own supply channels and be reimbursed by the contractor for the cost of such replacement parts. The reimbursement cost shall be established based upon the amount in the contractor's current commercial dealer net price list or [Master Data File] price, whichever is less.
>
> When the Government elects to correct the systems itself, the contractor shall reimburse the Government for the cost of labor involved in the correction, inclusive of the cost of end item disassembly and reassembly. The cost of labor shall be computed at the rate of $_____ per hour multiplied by the number of labor hours or portions thereof for such services in the contractor's flat rate time schedule manual or the Government [Maintenance Allocation Chart], whichever is less.
>
> The contractor shall remit payment by the [15th day of each month] for all warranty claims submitted by the Government for reimbursement which were received by the contractor during the previous [month]. The [monthly] payment shall be by check made payable to _____. The payment shall be accompanied by a statement which identifies the payment, the claim number, unit identity code, claim date, total dollars (broken out between parts and labor), and contract number(s) for each claim covered.

Equitable Price Adjustment: Provisions should be reduced to terms which are concrete. For example:

> If the Government elects to effect repair, the contract price shall be reduced by $_____ for each system repaired and by $_____ for each component or part, with a cap of $_____ for any single failure event.

Performance Requirement Breach—Redesign: The failure to meet a performance requirement may require a redesign. Because such a liability is significant, the warranty should clearly indicate the requirements:

> In the event of a breach of one or more of the essential performance requirements as stipulated in paragraph _____, the contractor will determine the cause of the breach and develop a solution. If the solution involves a redesign and retrofit, normal MIL-STD-973 configuration control procedures will apply. All costs for engineering analysis, redesign, and retrofit shall be borne by the contractor.

Maximum Liability: The purpose of a warranty is not to put the contractor out of business. However, the effectiveness of warranties is constrained by limits on contractor liability. When warranty liability limits are used, the basis for established limits should be rational and well documented. Only in the more risky situations, for which it would be unfair or unreasonable for the contractor to assume all risk, is a liability cap genuinely appropriate:

> The contractor's maximum liability under this warranty provision shall not exceed $_____.

MTBF Guarantee: The MTBFG can require that the contractor not only fix the low-reliability problem, but also provide consignment spares in the interim:

> In the event the measured MTBF is less that the guarantee value, the contractor shall, at no additional cost to the Government, furnish the following:
>
> (1) Engineering analysis to determine the cause of nonconforming MTBF.
> (2) Corrective engineering design changes.
> (3) Modification of the systems, spare systems, and spare parts as required.
> (4) "Pipeline" system spares as needed by the Government on a consignment (no-charge loan) basis, but no greater than that provided by the following formula:
>
> [Formula that determines amount of consignment spares as a function of the MTBF deficiency, number of warranted systems, pipeline time, and spares-sufficiency level.]

A limit may be appropriate for the number of consignment spares that may have to be provided. This form of the MTBF guarantee may also include the requirement for the Government to return the consignment spares if and when the MTBF improves.

Logistic Support Cost Guarantee—Correction of Deficiencies: A generic clause for a remedy applicable to a LSCG is as follows:

> In the event the measured logistics support cost (MLSC) fails to meet the prescribed target logistics support cost (TLSC), the contractor must institute a correction-of-deficiencies (COD) course of action that will bring the logistics cost within the prescribed target. Such action may include development of engineering change proposals (ECPs), provision of additional logistics assets, or both. The contractor's proposed course of action must be submitted to the Government prior to implementation for review and approval.

4.3.2.2 Transportation

Transportation—Contractor Pays: Many "standard" or "baseline" warranty clauses suggest that the contractor assume all transportation costs for all items repaired under the warranty provisions. For example:

> When items covered by this warranty are returned to the contractor pursuant to the terms of this warranty, the contractor shall pay the transportation costs from the place of delivery specified in the contract to the contractor's plant and return to said place of delivery.

Use of a standard place of delivery removes the uncertainty of the liability associated with widespread deployment of the warranted systems. Not all clauses specify complete contractor transportation liability. Another approach is for the Government to pay for shipping to the contractor and the contractor to pay for return shipping. However, for simplicity and ease of administration, it is recommended that consideration be given to assumption of all transportation costs by the contractor.

4.3.2.3 Warranty Data and Reports

Data on Correction: The contract usually imposes warranty data requirements to implement certain elements of the warranty (such as turnaround time), to assess the effectiveness of the warranty, and to maintain appropriate inventory and configuration control:

> The contractor shall prepare and furnish to the Government data and reports applicable to any correction required under the clause. [Reference applicable data item descriptions (DIDs).]

For the more extensive forms of warranty, the Government may want the contractor to provide an assessment of the warranty effectiveness--perhaps through a periodic report or a report due at the end of the warranty. Thought should be given to requiring data reports in a form compatible with common database software for ease of Government manipulation and information retrieval (dBASE IV, for example).

4.3.2.4 Warranty Marking

To ensure that the warranty coverage is not lost, the contractor should be required to mark the systems properly. For example:

> The contractor shall apply a permanent warranty notification stamping or marking on each warranted system item in accordance with MIL-STD-130 and, when appropriate, mark each container in accordance with MIL-STD-129.

Contract number, expiration date, brief processing instructions, and shipping destination may be specified.

4.3.2.5 Warranty Seals

Although the warranty should not be voided if the Government attempts repair, a clause requiring installment of suitable seals may be advisable:

> The contractor shall design and install seals on the system so as to preclude unauthorized repairs or tampering. The contractor must adequately demonstrate that inadvertent seal breakage is unlikely. The design of such seals must be approved by the Government.

Inadvertent seal breakage can cause difficulties. Seal breakage, of and by itself, should not be an exclusionary provision if clear, convincing evidence exists that unauthorized repair was not a material cause for warranty breach.

4.3.2.6 Installation of Warranty ECPs

The contractor may elect to develop and implement an ECP to reduce future failures. If a Class I ECP is approved, the contractor is normally required to install such ECPs in all systems returned for warranty correction:

> The contractor shall install all approved Class I warranty ECPs in systems shipped to the contractor during the warranty period.

The terms of the warranty may also make the contractor liable for supplying modification kits for warranted systems whose configuration has not been updated as of the warranty end date. This is typical of an RIW.

4.3.2.7 Technical Manuals

A prime method of disseminating warranty provisions applicable to using activities is by relevant technical publications:

> The contractor shall include those warranty provisions applicable to using activities in all pertinent technical publications under this contract.

4.3.3 Government Obligations

For the warranty to be implemented efficiently and fairly, the Government will incur certain obligations in administration, testing, notification, shipping, data, maintenance, and ECP approval. The following subsections address these topics.

4.3.3.1 Warranty Administration

The Government must establish an effective organization and set of procedures to administer the warranty. No matter how carefully the warranty is constructed, there is always the potential for disagreement on coverage, failure definition, corrective-action

requirements, or other areas. The following specific clauses are related to overall administrative and contractual matters.

Cancellation of Coverage:

> The Government retains the option to cancel warranty coverage on any system, prior to delivery and acceptance, without prejudice [or] with an equitable price adjustment.

Evidence for Warranty Adjustment Claim:

> The contractor shall retain the right to inspect, concurrently with Government representative, any defective part, wherever located, within [30 days] of notification of warranty claim, for the purpose of evaluating the cause of or the existence of the defect(s). If instructions are not received within the [30-day period], the Government will dispose of defective parts. The above described inspection right, however, does not relieve the contractor of responsibility to initiate the warranty replacement/repair action when notified by the Government of a warranty claim.

Warranty technical publications should contain explicit instructions to retain failed items for the appropriate period.

Government-Directed Corrective Action: If there is disagreement as to whether a warranty breach has occurred, the Government will generally be obligated to direct the contractor as to the disposition of the system:

> Notwithstanding disagreement as to the existence of a deficiency, the contractor shall implement corrective action directed by the contracting officer. If it is determined at a later date that no deficiency existed, the contract price will be equitably adjusted.

4.3.3.2 Testing and Verification

The Government may obligate itself to perform field tests and verification procedures to ensure that a weapon system is in fact defective and that no causes for warranty exclusion are evident.

Testing—Special Performance Test:

> The Government will perform product verification tests at [test site] as described in paragraphs [A] and [B] as a means of verifying that the items meet the performance requirements stated in the contract.

Testing—Field Failure Verification:

> The Government shall, to the extent practicable, verify that the warranted item has failed, using appropriate procedures and test equipment [specific procedures/equipment may be referenced].

Verification of No Tampering:

> The Government shall verify, at authorized maintenance facilities, that tampering or unauthorized maintenance has not occurred (unless there is clear evidence that unauthorized maintenance was not the cause of a warranty breach).

4.3.3.3 Notification

A typical statement of the Government's obligation, if any, to notify the contractor is as follows:

> The contractor shall be notified in writing of any warranty breach within ____days after discovery of the breach.

In many cases, this is followed by a statement that the contractor is not relieved of the warranty obligation if timely notice is not provided.

4.3.3.4 Shipping

To minimize damages during transportation, a clause similar to the following may be included:

> All shipping containers will be provided by the Government [or] contractor and will meet the protection requirements of container specification [XYZ].

No Batch Shipments: If a turnaround time is imposed on the contractor, the Government is obligated to avoid batch-shipments:

> The Government shall promptly ship each nonconforming system to the contractor and not batch shipments.

4.3.3.5 Data

Government data can assist the contractor to perform failure analysis and repair. The Government may be obligated to provide such data with a clause similar to the following:

> The Government will make available to the contractor all data relating to ____, including [data report references].

4.3.3.6 Maintenance

To protect both itself and contractor, the Government should obligate itself to use properly trained maintenance personnel and procedures:

> The Government shall ensure that its personnel or designated representatives are properly trained and will perform maintenance on the system in accordance with appropriate technical publications.

4.3.3.7 ECP Approval

If the contractor submits a no-cost ECP to correct a problem that is causing a warranty breach, the Government should expedite processing, especially if the system is still in production. The following clause indicates such intent:

> In the interest of cost control effected through warranty provisions, the Government agrees that no-cost ECPs, submitted in accordance with MIL-STD-973, to improve reliability and maintainability for the _____ will receive expeditious processing. Notwithstanding this special processing, any such ECP shall be formally incorporated in the contract by the Government _____ days after receipt by the principal contracting officer, unless the contractor has received written notification of its disapproval from the Government prior to that date.

4.4 SPECIFIC WARRANTY APPLICATIONS

The following subsections summarize warranty applications for various systems. The summaries are based on system characteristics as well as studies of sample warranties procured both before and after passage of 10 USC 2403.

4.4.1 Avionics and "Black Boxes"

Avionics and "black-box" systems are usually readily transportable, self-contained, and capable of being clearly marked. Therefore, they are amenable to warranties involving contractor repair. If organic capability already exists, the bill-back procedure may be appropriate for an assurance form of warranty. Despite advances in built-in test equipment, a number of removals from aircraft that are verified at the base exhibit no-evidence-of-failure at intermediate or depot maintenance activities. Therefore, the problem of unverified failures must be addressed. Typically, for a contractor repair situation, the repair level is established to be the line-replaceable unit (LRU) or weapon replaceable assembly (WRA); however, module or shop replaceable unit (SRU)-level warranties have been used as well.

4.4.2 Fixed Ground Systems

For large ground installations such as a command, control, and communications (C^3) system, the logistic support cost guarantee approach may be considered to "freeze" Government post-fielding operation and maintenance costs. This method is frequently used by commercial airlines to fix operating costs when procuring new aircraft, but the method may lack Government application as it is in contravention to the self-insurance concept. Collecting necessary data to implement such an approach may be difficult, but it is much easier to do for a few large, fixed systems than for numerous, widely-dispersed smaller items. The system must be supplied by a single prime contractor. If there are a number of suppliers and the using activity has its own maintenance capability, bill-back under a standard assurance warranty form may be sufficient. If the system is used continuously, some form of availability guarantee may be applicable.

4.4.3 Vehicular Systems

Many of the vehicles purchased by the military services have extensive commercial components and come with existing commercial warranties. If the military has organic maintenance capability, Government maintenance with bill-back is generally preferred. In most instances, the existing commercial warranty for engines and transmissions is not negotiable.

4.4.4 Ships and Ship Systems

Ship warranties traditionally start at the time of preliminary acceptance and last during the sea-trial period, typically six to nine months. For such trials, which include final contract trial and post-shakedown availability, the ship is fully equipped, armed, and operated by Navy personnel with Government-approved contractor representation. Defects found are corrected by the contractor within the provisions of the contract. Final acceptance by the Government is regarded as conclusive.

Ship systems are somewhat unique. Warranted systems may be "bolted to the ship" and repair capability varies from ship to ship. Thus, failure of a warranted system on an aircraft carrier may be repaired by Navy personnel, while a similar failure on a frigate may be transported back to the contractor for warranty action. Since repair capability can vary, a warranty that allows for Government selection of repair options may be prudent.

4.4.5 Missile Systems

Warranties on missile systems generally depend on the tests conducted to verify that established performance parameters are satisfied. In most cases, the parameters relate to reliability or availability, such as storage failure rate, ground check-out reliability, captive-carry MTBF, launch success rate, and operational availability. Often data from a number of different types of tests and operations are combined. For example, for the air-launched cruise missile, data from prelaunch tests, operational test launches, joint test assembly launches, random testing of stored systems, and operational readiness tests were all used to implement contract availability guarantee provisions.

4.4.6 Satellite Systems

Warranties on satellite systems typically include guaranteed performance measures with positive and negative incentives. Accordingly, the number of available communication channels on a year-to-year basis may be guaranteed over the expected life of the satellite. If more channels are available than guaranteed, the contractor receives a positive incentive or award-fee payment. If fewer channels are available than guaranteed, a penalty or negative-incentive feature is invoked.

CHAPTER FIVE

WARRANTY DEVELOPMENT

5.1 WARRANTY AND SYSTEM LIFE CYCLE

This section provides a general overview of warranty-related activities from a system life-cycle perspective. To develop an effective warranty, the program manager needs to plan for the completion of these activities. This section also addresses warranty impacts on the acquisition strategy and procurement plan, the system specification, and the program office organization as key planning factors for the program manager to consider early in the system's life cycle. Contractor risks are also considered.

5.1.1 Life-Cycle Overview

Figure 5-1 shows how warranty-related activities interface with the system life cycle. These activities are summarized by phase as follows:

- Concept Exploration & Definition: Technical and support concept studies are performed to identify characteristics for warranty consideration.
- Demonstration & Validation: The expected warranty provisions are developed as system requirements.
- Engineering & Manufacturing Development: The warranty provisions from Demonstration & Validation are updated to reflect better estimates of system R&M, support parameters, and costs. The provisions are then incorporated into the production RFP. A series of tasks to implement, enforce, and manage the warranty provisions is developed and coordinated.
- Production & Deployment: Tasks to implement, enforce, and manage the warranty provisions are finalized.
- Operation & Support: The warranty provisions are implemented and administered.

5.1.2 Acquisition Strategy

To obtain maximum effectiveness, it is important that the warranty concept be considered early in the weapon system's life cycle. Decisions on equipment configuration and design affect the warranty approach as well as the planning needed to maintain and support the warranted system.

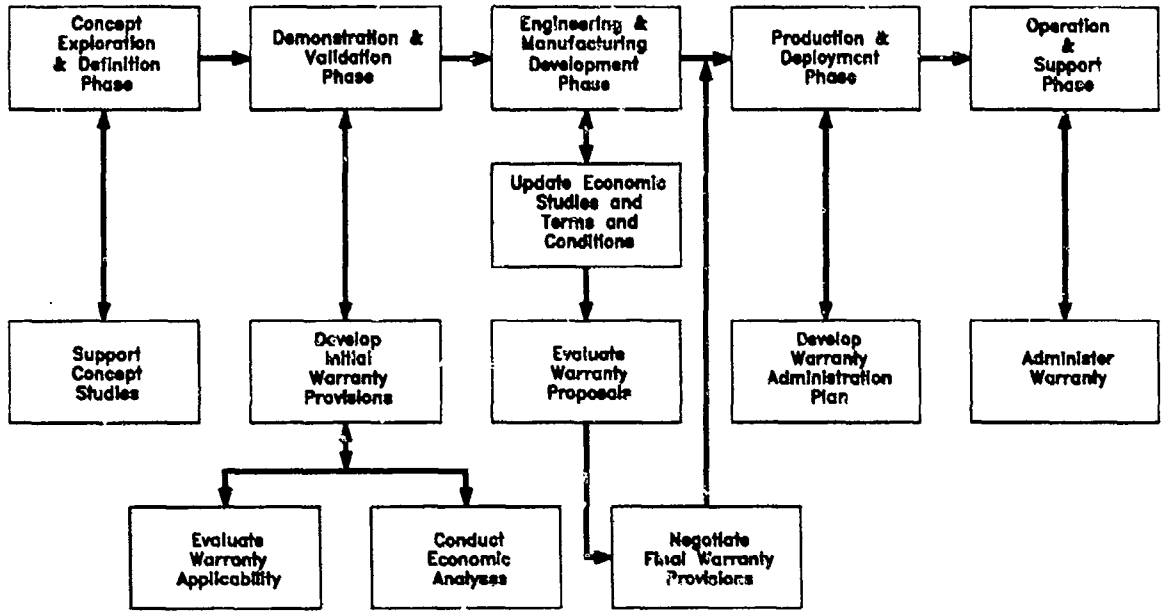

Figure 5-1: System Life Cycle

The RFP for Demonstration & Validation may include sample warranty provisions that notify the contractor of the warranty performance requirements being considered for the production system. The sample warranty provisions should be qualitative descriptions of the warranty coverage desired. Actual warranty requirements should be defined only after system performance experience is accumulated and evaluated from tests and analyses performed during Demonstration & Validation.

The program manager may decide to include a detailed warranty requirement in the RFP for Engineering & Manufacturing Development to indicate the warranty coverage expected for production systems. The program manager should develop the warranty requirements from requirements documents and system performance characteristics determined during Demonstration & Validation as well as further engineering studies and cost-benefit analyses. In addition, the program manager may decide to have the Engineering & Manufacturing Development contractor(s) propose alternative forms of warranty that would be more advantageous to the Government.

Table 5-1 presents a general sequence of steps to develop a warranty approach, starting early in the system's life cycle. Those steps applicable to the procurement should be included as part of the acquisition strategy for the weapon system.

Table 5-1

DEVELOPMENT STRATEGY

1. Perform studies to identify essential performance characteristics to consider for warranty and identify candidate approaches.
2. Develop criteria and models and collect applicable data to perform evaluations to decide between assurance and incentive types of warranty.
3. In conjunction with technical, user, logistics, and contract personnel, develop candidate approaches and assess the feasibility of candidate approaches, including implementation and administration.
4. Develop preliminary clauses or draft provisions for Demonstration & Validation RFP, or provide "trial balloons" to potential contractors to obtain industry comments.
5. Issue Engineering & Manufacturing Development RFP with "expected" warranty provisions for the production contract, or have contractor propose alternative forms of warranty to the Government.
6. Finalize warranty terms and conditions for the production RFP.
7. Develop a warranty selection strategy and decision model.
8. Issue an RFP with a warranty option.

5.1.3 System Specification

A key element in the development of an effective warranty is the system specification. It defines system requirements. Ordinarily, it is developed prior to completion of the Demonstration & Validation phase. The requirements in the system specification (Type A) are translated to development specifications (Type B), normally before or at the beginning of Engineering & Manufacturing Development. Product, process, and material specifications (Types C, D, and E, respectively) are applicable to the production equipment. System specification requirements can be in terms of design details, performance, or most likely a combination of the two. Performance requirements are preferred over design specifications to attract interest from large segments of industry for competitive bidding. Performance requirements allow flexibility to integrate warranty considerations. If the specification establishes detailed design requirements, it is doubtful that the contractor can be held liable for performance parameters, unless such a liability is specifically assumed in writing in the contract. In such cases the design is, for all intents and purposes, implicitly imposed.

It is DoD policy that a warranty should not apply to goals or objectives. In addition, qualitative statements cannot be meaningfully used without a potential for dispute. Thus, a requirement such as, "the XYZ system shall have high reliability when used in the manner intended," must be translated to a numerical reliability requirement that is unambiguous and readily measurable to determine conformance. Although such a translation may be accomplished any time before the production RFP is issued, it is much more effective if the specific requirement is imposed as early in the program as possible. In that way, the contracting community knows what is expected and also knows that such a requirement may become a warranty performance parameter. Specific recommendations to include requirements in the specification, giving consideration to warranty development, are as follows:

- Requirements in the system specification and flow-down specifications must be quantitative.
- Requirements used directly for warranty coverage must clearly define the operational or special test conditions.
- Methods to determine conformance to requirements must exist or be amenable to development.
- Only a small subset of specification requirements should be selected for warranty coverage.
- Higher-level, mission-related requirements are generally preferred to sublevel requirements for warranty specification (system MTBF instead of subassembly MTBFs, for example).

5.1.4 Program Coordination

It is the program manager's responsibility to plan, coordinate, and integrate warranty application as early in system development as humanly possible. The selected warranty approach should serve as a lever to enhance system reliability by configuration, design, and maintenance and support parameters. Essential performance warranties should be fully integrated into the weapon system program.

The program manager is responsible for assuring that the system warranty is developed and implemented effectively. The military services and program managers usually designate a warranty manager to act as the focal point for warranty task performance. The warranty manager serves as the functional interface between the program manager, user, contracting officer, and supporting activities.

The warranty must be consistent and compatible with operational and logistical concepts and with the overall acquisition strategy. To secure consistency and compatibility, the team concept should be employed from the start. The program manager should involve all using and supporting commands and agencies throughout the planning process. Functional interfaces between the program office, user, and supporting activities ensure maximum benefit from warranty application.

5.1.5 Contractor Risk Considerations

New procurements harbor significant technical, operational, schedule, and financial challenges. A warranty is a means to shift part of the development and acquisition risks to the contractor. However, if consideration is not given to the risks the contractor assumes when undertaking a warranty, the effectiveness of the warranty is undermined. Warranty price will increase as uncertainty increases. It is unreasonable to ask contractors to incur extraordinary losses, the reasons for which were not reasonably foreseeable. The viability of the entire program might be threatened. Table 5-2 lists contractor risk factors and means to reduce or eliminate them.

5.2 CONCEPT EXPLORATION & DEFINITION PHASE

The program manager evaluates and selects alternative system development concepts to meet the stated mission need. The concepts should address the functional and performance characteristics necessary to meet the mission need along with any necessary interfacing capabilities. They should be accompanied by preliminary life-cycle cost estimates and logistics supportability plans.

Although the system is treated in general terms, evaluations may be conducted in terms of system reliability and projected life-cycle costs. Warranty or other control methods (award fee and performance incentives, for example) may be considered means to achieve stated goals for reliable performance pursuant to 10 USC 2403 and maintain costs within resource limitations. Program documentation should clearly reflect initial criteria to employ warranty control techniques. Table 5-3 lists major acquisition activities in this phase and warranty interfaces for development and implementation application.

5.3 DEMONSTRATION & VALIDATION PHASE

The program manager identifies the system development concepts and approaches that have the greatest potential to meet the mission need in the most cost-effective manner. The concepts are verified and associated risks and uncertainties are identified and resolved where possible, usually through trade studies, models, prototypes, and demonstrations. System and subsystem documents as well as solicitation documents are completed to support contracting for the Engineering & Manufacturing Development of the selected concepts. Table 5-4 lists major acquisition activities in this phase and warranty interfaces for development and implementation application.

Although warranty application is generally associated with the production contract, warranty requirements may influence design, production processes, parts selection, and quality control in an effort to enhance reliable system performance. The RFP for Engineering & Manufacturing Development should contain preliminary warranty provisions intended for use in the production contract.

Table 5-2

CONTRACTOR RISK REDUCTION

RISK FACTOR	RISK REDUCTION APPROACH
Late Notification of Intent to Use Warranty	Alert contractor as early as possible during engineering development of intent to use warranty for maximum opportunity for design optimization.
Detailed Government Specification of Item Design	Maximize use of functional specifications to promote design flexibility.
Application of Incentive Warranties to Advanced Technology	May not be appropriate for completely revolutionary design. With new technologies, should fund and schedule provide adequate reliability testing. Consider a cost-sharing warranty agreement.
Reliability-Production Uncertainty	Specify minimum acceptable level of reliability. Provide operational and environmental data to the contractor. Include adequate time and funding for reliability test effort in the development contract.
Unpredictability of Inflation Rates for Long-Term Agreements	Couple warranty price with economic adjustment provisions to account for inflation.
Failures Outside Contractor Control	Provide normal exclusions. Carefully word exclusions for mishandling.
Large Number of Unverified Failures ("Test Goods") Returned to Contractor	Carefully tailor contractual provisions so costs of processing are equitably shared.
Items Usage Rate not Precisely Known	Provide for a price adjustment for significant usage-rate variation or have a total operating time cut-off.
Data Not Supplied to Contractor as Required	Include Government responsibilities to meet data obligations in a timely manner. Contractor performance may be related the receipt of applicable data.
Uncertainty of Shipping Destinations for Warranted Items at Time of Bidding	Assume shipping costs if there is significant uncertainty.
Effect on Turnaround Time of Events Outside Contractor Control	Include relief from turnaround time obligation for specified conditions
Time-Consuming Procedures for ECP Approval	Provide warranty provisions for expeditious approval of ECPs—perhaps automatic approval unless notification is given within a certain time.

Table 5-3

CONCEPT EXPLORATION & DEFINITION PHASE

ACQUISITION ACTIVITY	WARRANTY INTERFACES
Requirements Analysis	Identify key parameters as candidates for EPRs coverage.
Functional Analysis	Relate key performance parameters to applicable hardware/software elements.
Trade Studies	Analyze various warranty strategies and interfaces as trade studies are conducted in requirements, configuration, and supportability.
Technology/Risk Assessment	Identify potential warranty approaches to address identified risks.
Logistics Supportability	Consider impact of various warranty support strategies on overall logistics support structure.
LCC Assessment	Identify LCC factors to consider for warranty cost-benefit analysis.
Acquisition Strategy/Plans	Identify/update major warranty alternatives.

Table 5-4

DEMONSTRATION & VALIDATION PHASE

ACQUISITION ACTIVITY	WARRANTY INTERFACES
Engineering Development Models	Evaluate technology and performance to identify key risk factors.
Preplanned Product Improvement (P^3I)	Couple warranty alternatives with any P^3I alternatives under consideration.
Functional Baseline	Refine EPRs to be consistent with the functional baseline
LCC Update	Establish/refine requirements of LCC analysis if LCC is part of warranty acquisition strategy.
Test and Evaluation Master Plan (TEMP)	Define any test requirement necessary to implement warranty.
Preliminary Manufacturing	Address design and manufacture warranty requirements.
Industrial Base Issue	Address any potential impacts of warranty industrial base
Logistics Support Analysis	Update earlier analyses and define warranty alternatives that are consistent with planned ILS system.
Acquisition Plans	Update warranty acquisition plans.

The program manager must determine a warranty approach to the weapon system and identify preliminary terms and conditions for the warranty. A structured approach to warranty development is a step-by-step process:

- Initial screening: Initial screening is performed to determine if one or more warranty alternatives are appropriate.
- Economic analysis: If the initial screening results are positive, the candidate warranty alternatives are analyzed to determine the economic implications and appropriate warranty period.
- Development of provisions: Initial warranty provisions are developed. The program manager should maintain continuous coordination with using commands and support activities.
- Incorporation of provisions in Engineering & Manufacturing Development RFP: After proper initial review with cognizant procurement, legal, and other pertinent agencies, the initial warranty provisions are incorporated into the Engineering & Manufacturing Development RFP—primarily for informational purposes, unless a firm warranty commitment must be made at this time. Special bidder instructions may be necessary to clarify selected points. Additionally, special briefings with potential offerors may be necessary to elaborate on the intent of the provisions (some contractors may enjoy only limited experience with these concepts).
- Development of final preliminary provisions: As a result of the foregoing processes, the initial provisions may be developed to clarify wording, changes in coverage, and other issues. In the case of a combined Engineering & Manufacturing Development and Production & Deployment procurement, the final provisions may become part of the contract, typically as an option that may be exercised at a later point in Engineering & Manufacturing Development. If it is not a combined procurement, the provision may still undergo additional changes and evaluation as part of the production procurement.

5.4 ENGINEERING & MANUFACTURING DEVELOPMENT PHASE

The Engineering & Manufacturing Development phase culminates in a baseline configuration design. It also results in a documentation package that reflects the established cost, schedule, logistics supportability, and performance constraints. Table 5-5 list major acquisition activities and warranty interfaces during this phase.

During the Engineering & Manufacturing Development phase, better estimates of system reliability, maintenance and support parameters, and operating capabilities generally emerge. Warranty applicability and economic studies should be refined and updated, and warranty provisions should also be updated to reflect program or equipment modifications that have occurred during this phase. Major warranty evolutions in this phase are summarized as follows:

Table 5-5

ENGINEERING & MANUFACTURING DEVELOPMENT PHASE

ACQUISITION ACTIVITY	WARRANTY INTERFACES
Allocated Baseline	Define quantitative warranty requirements at appropriate subsystem levels.
System Prototypes Tests	Evaluate and use data to perform warranty analyses (e.g., LCC and R&M).
ILS	Address warranty implementation and administration.
Quality Assurance Plan	Identify approaches to implement warranty controls on design and manufacture and defects in materials and workmanship.
LCC Update	Update LCC model for warranty cost-benefit analysis and refine data base.
TEMP Update	Identify/update warranty test requirements.
Acquisition Plans	Interface with development and potential production contractors. Draft warranty RFP clauses for industry review. Evaluate comments.

- Warranty feasibility assessment: The initial economic analysis performed as part of the Demonstration & Validation phase should be updated or refined in light of current information. If a previous evaluation was not performed, an assessment should be initiated.
- Development of final provisions: If warranty provisions were not finalized as part of the Demonstration & Validation phase, provisions for the Production & Deployment phase are formulated or refined, with thorough coordination between program manager, support activities, and users.
- Production RFP provisions: Provisions are incorporated into the production RFP if they were not incorporated previously. Warranty issues addressed in the RFP include warranty management, claim processing, dispute procedures, facilities and equipment, in-plant material flow, warranty data, price, and prior performance. Instructions to bidders regarding required responses may be necessary.
- Proposal review: Production proposals must be evaluated with respect to warranty response. The spirit and intent with which offerors address warranty provisions as well as quoted price are the prime concern. If a warranty price quotation is obtained, the economic analysis should be reperformed using the quoted warranty cost in lieu of estimates. Any questionable points may be clarified in discussions held with contractors. Table 5-6 lists factors to consider in evaluating warranty proposals. The applicability of the factors and the detail to which they are considered will depend on the extent of the warranty commitment and specific

terms and conditions. Lastly, each contractor's prior performance is a superb discriminator in evaluating warranty responses.

- Warranty decisions: On the basis of the economic analysis, as well as mission and logistics factors, the program manager must decide among available warranty options. The decision should be made early enough (ideally at the time of long-lead-item commitment) to permit orderly planning by all affected activities, regardless of the choice made. If a warranty is selected, provisions to fund and effect warranty payments must be established.

Table 5-6

PROPOSAL EVALUATION FACTORS

FACTOR	EVALUATION CRITERIA
Warranty Management	Offeror's overall approach to manage the warranty program. · Clearly defined management group. · Adequate interface between warranty management, engineering design, reliability and quality control groups, and higher-level management within the organization. · Understanding of warranty objective and specific requirements.
Claim Processing	Ease and completeness of procedures. · Government notification consistent with existing maintenance processes. · Appropriate discrimination between contract repair and warranty actions.
Dispute Procedures	Approach to notification and resolution.
Facilities and Equipment	Existence, adequacy, and availability of resources necessary for warranty service. · Suitable primary repair, storage, receiving and shipping area facilities. · Adequate and suitable test equipment to process returns.
In-Plant Material Flow	Approach to process returned equipment. · Procedures consistent with terms and conditions to receive, test, repair, modify, store, and ship warranted equipment. · Methods to ascertain warranty applicability on returned equipment; understanding of specific exclusions and definitions of unverified failures. · Time sequence of material flow described, with rationale for a specified turnaround time.
Warranty Data	Capability to comply with data requirements. · Development and maintenance of a data system capable to meet complete data collection and requirements in a timely manner · Critical parameters specified, such as turnaround time, operational MTBF, and equipment modification status.
Price/Reliability Compatibility	Plausible relationship between warranty price and guaranteed reliability levels.
Prior Performance	Contractor history of warranty proposal and execution.

CHAPTER SIX

WARRANTY ADMINISTRATION

6.1 WARRANTY ADMINISTRATION ISSUES

Depending on the complexity of the warranty, the procedures and interfaces needed to administer a warranty vary considerably. Where program technical risks are relatively low and a simple warranty is adequate, administration may consist of merely reviewing a checklist and performing a rudimentary evaluation at the conclusion of the warranty. On the other hand, program risks may call for a warranty that requires extensive Government activity to administer. It was neither the intent of the warranty law nor the desire of the services to formulate a warranty policy requiring extraordinary efforts to administer. The motto for structuring warranty administration ought to be "make it easy to do it right." (Reference 17)

If administrative and reporting tasks are likely to rise above normal levels, the benefits of a warranty should be reexamined in light of "costs." Warranty costs include, after all, not only costs quoted by and paid to the contractor, but also all internal Government costs associated with establishment and administration of a warranty on a day-to-day basis. Excellent, enthusiastic implementation can save a weak plan, but poor implementation may relegate even the strongest plan to failure. The best way to ensure that the warranty will be workable in the field is to know it in advance—prior coordination. Before tackling warranty administration, the program manager must have a comprehensive knowledge of the underlying service's supply and maintenance systems. If the outcome of warranty administration is unknown or it will place unacceptable burdens on the user and/or support community, the warranty program should be reexamined with a view toward warranty restructure or waiver of the requirement. In short, a weapon system warranty which cannot be efficiently administered is a liability, not an asset.

6.2 WARRANTY ADMINISTRATION ALTERNATIVES

There are three general alternatives for administering weapon system warranties:

- Use contractor support to manage and administer the warranty in entirety, totally outside of service repair and distribution processes.
- Manage and administer the warranty using parameters which can be measured by existing maintenance/supply data collection systems without software modification and without requiring additional manpower. In other words, manage and administer

the warranty using that which is currently available without changes to service repair and distribution processes.

- Manage and administer the warranty using parameters which are measured by data from small-scale, intensive, in-house maintenance data collection efforts outside normal organic support processes. These intensive data collection efforts should be compatible with the user and/or support community. The program manager should select this option only if warranty parameters cannot be measured using data from existing data collection systems and if contractor support is not feasible (Reference 18).

6.3 PREPARATION FOR WARRANTY ADMINISTRATION

Once warranty provisions are under contract and the weapon system production has begun, it is too late to begin planning for warranty administration. Rereading and thoroughly understanding warranty contract provisions is not enough. The mechanics of warranty administration must be in place prior to production. The following subsections identify tasks that may be required for some of the more complex incentive types of warranties. For the simpler types of warranties, these tasks may be used as a checklist to be sure that all activities have been considered. The military service should designate a warranty manager who will act as the focal point for warranty task performance.

6.3.1 Item-Management Procedures

Although unique procedures and exceptions should be avoided, some warranties may mandate special item-management provisions, such as the following:

- The contractor's repair facility should be considered a stock point if the contractor performs repairs under the warranty.
- Warranted assets used by more than one service may require physical separation as they move through supply channels to a common repair source.

6.3.2 User Indoctrination

For some warranties, especially those that require special handling of assets, it may be desirable to prepare a training course or other means of indoctrination for personnel who manage or handle the assets.

6.3.3 In-Plant Inspection Requirements

For warranties in which Government-owned assets will be handled or processed by a contractor and the contractor's performance will be measured by in-plant activities, it may be necessary to plan for additional inspections by DCMC representatives.

6.3.4 Contractor Data Plan

If the contractor is required to supply data for the purpose of implementing a warranty or evaluating warranty results, it may be desirable to review the contractor's plan to collect and use the data.

6.3.5 ECP Reviews

Certain Government-directed design changes or contractor-proposed ECPs may abridge the effectiveness of a warranty. For both Government-initiated and contractor-initiated design change proposals, it is important for the contractor to provide a warranty impact statement. If the contractor claims that a design change will result in increased warranty cost or abridgement of the warranty, such a claim should be supported by adequate engineering rationale.

6.3.6 Contractor's Maintenance Facilities

If a warranty requires the contractor to perform maintenance on warranted assets, the Government should conduct a survey of the contractor maintenance facilities to substantiate that the capacity is sufficient throughout the warranty period and that repair of production-line assets (belonging to the contractor) will not interfere with repair of warranted assets (belonging to the Government).

6.3.7 Required Test Plans

For some warranties, the contractor's performance or compliance may be determined by prescribed tests. The Government may be required to develop such test plans or to review plans developed by the contractor.

6.3.8 Data-Capture and Transmittal Methods

Data will be required from the deployed warranted system. The data is needed to administer the warranty and to evaluate benefits at the conclusion of the warranty. Planning is required to ensure that the appropriate data is collected and sent to the warranty manager in time to meet project needs. Such automated information systems as the Product Quality Deficiency Reporting System databases (U.S. Air Force), Deficiency Reporting System (DRS) and Fielded Vehicle Performance Data System (FVPDS) (U.S. Army), and Aviation Maintenance Material Management System (3-M) (U.S. Navy) might assist in capturing and processing warranty data. To date, the jury is still out on such systems some of which are still developmental.

6.3.9 Warranty Markings and Seals

The Government should approve warranty markings and seals that may be required. If seals are required, they should be of a type that is not easily broken.

6.4 WARRANTY IMPLEMENTATION AND ADMINISTRATION PLANS

This section presents guidance to prepare an implementation plan for the warranty. The plan may also be referred to as an warranty administration plan or warranty technical bulletin. The purpose of the implementation plan is to provide a complete, comprehensive document that describes the features of the warranty, defines the responsibilities to meet the provisions of the program, identifies the responsible participants, and establishes the procedures and interfaces required for successful implementation and management of the warranty. Appropriate topics include:

- Warranted items, coverage, and duration.
- Maintenance and handling procedures for warranted equipment.
- Transportation management.
- Inventory management.
- Notification of warranty claims.
- DCMC responsibilities.
- Configuration management.
- Funding.
- Warranty data reporting.
- Special training for warranty implementation.

All the services acknowledge the need for some form of warranty implementation plan, even though their plans differ. The materiel developer (program manager) typically prepares the plan and staffs it to all concerned parties (using commands and logistics support activities) for comments, recommendations, and, ultimately, concurrence or approval. It may also be appropriate to solicit contractor comments, depending upon the level of contractor participation in warranty implementation and administration.

There are two kinds of warranty implementation plans: those prepared by contractors and those prepared by the Government. Contractor plans are prepared in response to the contract requirements. The decision as to whether a contractor must submit an implementation plan should be based on the criteria used to determine the need for a Government implementation plan. This guidebook addresses only Government requirements for implementation plans.

Warranty contractual provisions may originate in a program office (for development-production procurements) or an item manager's or system manager's office (for reprocurements or procurements not associated with a substantial development effort). In some cases, the crafters of the warranty are not the same people who will have to implement, administer, and evaluate them. Most warranty implementation plans are prepared by the same organization that prepares the warranty—all the more reason why implementation plans must be staffed and thoroughly coordinated.

Figure 6-1 shows the three major considerations that guide and constrain the implementation procedures and, therefore, the implementation plan. Warranties range in complexity. Some are simple and some call for protracted contractor participation. If the contractor is required to perform warranty-related tasks for an extended period after the system is fielded, the implementation plan must include workable procedures that are workable within the logistics-support system and the equipment's operating conditions.

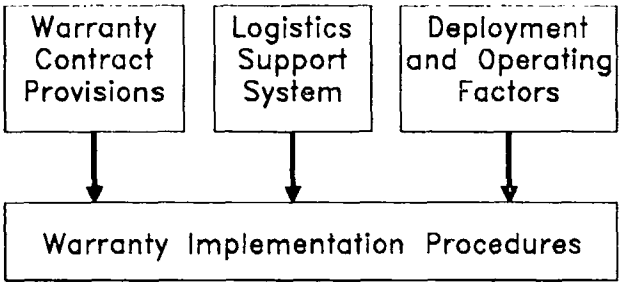

Figure 6-1: Implementation Factors

6.4.1 Implementation Plans

The following subsections address pertinent matters regarding warranty implementation plans. It is best to develop the plan concurrently with structuring the warranty.

6.4.1.1 Plan Requirements

Some services require an implementation plan regardless of the simplicity or the technical needs of the warranty. From a technical viewpoint, the program manager should decide whether or not to prepare an implementation plan. The program manager is most familiar with contractor and Government responsibilities. The program manager also knows the logistics-support system and the weapon's deployment and operational factors. Nearly all warranties require explicit implementation procedures, depending on the contract provisions. As the warranty provisions are formulated and program logistics, engineering, and contracts representatives review the provisions, it should become clear whether or not a plan is required and how detailed it need be. In general, some form of warranty implementation plan is required if one or more of the following requirements apply:

- The warranty contract provisions require the Government to perform actions or tasks.
- The contractor is required to perform actions or tasks that need Government monitoring, inspections, or reaction.
- The contractor is required to submit deliverables related to the warranty.
- There is a requirement to evaluate the warranty effectiveness.

Joint Service Weapon Systems

It is customary to establish a lead service for the procurement of weapon systems fielded by more than one service. The other user services may have representatives at the lead service program office and logistics office. In such cases, the warranty contractual provisions must be prepared within joint constraints of all user services. Similarly, the implementation plan must accommodate the constraints of all user services. Service logistics representatives should ensure that the plan is workable within the constraints of their operation and support systems.

Foreign Military Sales Weapon Systems

If a Foreign Military Sales customer must participate in a warranty program, the same type of joint effort and coordination as described for joint service procurements would be required for the FMS customer. Due to the length of the lines of communication, it may be best to dissuade foreign military service participation in U.S. weapon system warranty programs.

6.4.1.2 Plan Schedule

Preparation of the warranty implementation plan may begin with the inception of the warranty structure evaluation and selection process. The final plan is not prepared until the procurement contract is negotiated since some of the warranty provisions may change. Material changes should not be made without the concurrence of the affected parties. Draft plans should be thoroughly staffed to user and support communities for comments and recommendations. The final plan should be available to the system users and support activities in time to allow for any training that may be necessary.

6.4.1.3 Plan Authority and Coordination

The warranty implementation plan is an informational type of document. It may be from one command to another in the form of a Memorandum of Agreement (MOA) or Memorandum of Understanding (MOU) or be directive in nature and carry the full authority of the common superior of the material developer, system users, and support activities, such as a service-level directive. It is not a contractual document, so contractual-type language should be avoided. The plan contains approved service procedures—endorsed by the developing command, supporting command(s), and user(s)—that will make the warranty workable. It is also important that the plan be reviewed by the contracting officer and a legal representative. The contracting officer needs to know how the plan will interface with the contract, and legal review will ensure that the plan does not introduce a legal problem between the Government and the contractor. It is normally appropriate for the weapon system contractor to review the plan to see how the entire implementation fits into contractual obligations.

6.4.1.4 Plan Topics

The topics for the implementation plan will vary considerably with the nature and complexity of the warranty. Three items are needed to prepare the plan:

- A copy of the warranty contract provisions.
- A warranty checklist (appendix I).
- A thorough understanding of the operating and logistics support parameters of the warranted weapon system.

Every warranty contract requirement has to be deliberated in terms of how, where, when, why, and by whom it is to be accomplished.

6.4.2 Plan Preparation Checklist

Appendix I contains two checklists to help ensure that all applicable topics have been addressed in the warranty development and plan preparation processes. The checklists are not all inclusive, but should stimulate thought that will reveal other needed topics.

6.5 CONCLUDING OR EXTENDING THE WARRANTY

Prior to the expiration of an extensive form of warranty, particularly one requiring contractor depot repair (such as RIW), the Government must assess whether the warranty should be continued or allowed to expire. Extension options for warranty provisions are sometimes included in the original warranty contract, but such provisions are not necessary, since the Government and the contractor can enter into negotiations for contract extension at any time. If the original contract includes a fixed-price extension option, so much the better—negotiations are eliminated, and the decision to exercise the option is simplified.

The decision to extend a warranty should be based on whether or not the perceived risks that originally spawned the need for a warranty have been reduced to an acceptable level; if they have not, a candid appraisal should be made to assess the relationship of risk to continuation of the warranty. For some weapon system procurements, there may be a perception of little risk for which a warranty would pertain. Application of a warranty to such procurements satisfies the law and is probably a no-cost, or at least a low-cost, assurance type of warranty. If the perception of low risk is substantiated during the warranty period, the warranty should be allowed to expire. Transitioning out of such warranties may consist of nothing more than a letter of acknowledgment from the contractor that the warranty will soon expire and contractor obligations will terminate. At that time, the program manager should undertake an evaluation of the benefits that resulted from the warranty. For complex warranties—those under which the contractor had to become part of the support system—the decision to extend a warranty may hinge

on more than a projection of economic benefits. Some of the noneconomic factors that may influence the decision to extend a warranty include the following:

- Organic support capability status.
- Test equipment (hardware and software).
- Technical documentation.
- Maintenance training.
- Facilities.
- Personnel.
- Adequate spares.
- Warranted asset configuration status.
- Special repair procedures that may have been developed by the contractor.
- Impacts on other services and FMS customers.
- Need and ability for gradual transition.
- Contractor's performance.

In the event that any of these factors precludes a transition from contractor to organic support, it may be prudent to discontinue the contractor's warranty obligations and risks and provide for continued contractor support under separate contractual arrangements. This may be facilitated under a contract that is already in place for contractor repair of excluded failures. Of particular concern is a transition from a relatively short contractor repair turnaround time to the conventional organic time that may be as long as 90 to 120 days, inducing a need for more spares to maintain readiness levels.

6.6 ASSESSMENT OF WARRANTY BENEFITS

There is an inherent difficulty in the quantitative assessment of warranty benefits. There is no comparative measure of weapon system performance in the absence of a warranty. Although subjective, an analysis is nevertheless required. Results may be accumulated at a central service repository, if one exists, so that global assessments can be made. Warranty benefits assessment should address at least the following:

- Warranty influence on EPRs.
- Economic impact on the Government and the contractor(s).
- Noneconomic benefits of the warranty.
- Workability of the warranty (ease of implementation).
- Contractor performance and actions under the warranty.

Economic analyses should be attempted if feasible and relevant. For warranties with identifiable costs, the economic analysis is a refinement and verification of the cost-benefit

analysis that was performed before the warranty was contracted. For some warranties, there will be no recognizable costs. For example, there may be no costs associated with an assurance type of warranty on a proven item that requires no contractor actions if the warranty provisions are satisfied.

An assessment of the benefits of the warranty will be subjective. It should consist of an evaluation of warranty implementation success. The assessment of warranty benefits, along with appraisals of contractor performance, should be documented for the record. Periodic review may provide valuable insight into the constituents of warranty effectiveness. Implementation difficulties should be recorded as "lessons learned."

CHAPTER SEVEN

WARRANTY COST-BENEFIT ANALYSES

7.1 REQUIREMENTS FOR COST-BENEFIT ANALYSES

DFARS 246.770 requires that weapon system warranties be cost-effective. The following subsections summarize Congressional, DoD, and service policy and guidance for conducting cost-benefit analyses.

7.1.1 Conference Report of the 1985 DoD Authorization Act

The conference report of the 1985 DoD Authorization Act (in enacting the current warranty requirements of 10 USC 2403) expressed strong concern for warranty cost-effectiveness. It questioned the fact that virtually no waivers were processed in 1984 under the original warranty bill (Section 794) and added that the Senate and House Committees on Armed Services never intended that the services obtain "cost-ineffective" warranties. As a result, the conference report directed military departments to establish effective cost-benefit analysis mechanisms for proposed weapon system warranty evaluation.

7.1.2 DFARS Subpart 246.7

As presented in DFARS Subsection 246.770-7, it is DoD policy to obtain only cost-effective warranties under 10 USC 2403. If a specific warranty is not considered cost-effective by the contracting officer, a waiver request should be initiated following procedures described under DFARS Subsection 246.770-8. In assessing the cost-effectiveness of a proposed warranty, an analysis must be performed which considers both the qualitative and quantitative costs and benefits of the warranty. Costs include warranty acquisition, administration, enforcement and user costs, weapon system life-cycle costs (with and without a warranty), and any costs that result from limitations imposed by warranty provisions. Costs incurred during development specifically to reduce warranty production risks should also be considered. The cost-benefit analysis must also consider logistical and operational benefits expected as a result of the warranty as well as the impact of any additional contractor motivation provided by the warranty. Where possible, comparisons may be made with the historical costs to obtain and enforce similar warranties on similar systems. The analysis should be documented in the contract file.

7.1.3 Service Policies

Each of the services has its own method to conduct warranty cost-benefit analyses.

7.1.3.1 Army

Army requirements for weapon system warranty cost-benefit (cost-effectiveness) analyses are contained in AR 700-139. Additional guidance is contained in AR 11-18 ("The Cost Analysis Program") and AR 11-28 ("Economic Analysis and Program Evaluation for Resource Management"). The Army made available the microcomputer-based Warranty Model (WARM) to assist program managers. It was developed by the U.S. Army Aviation Systems Command (AVSCOM) as a disciplined methodology to assess weapon system warranty cost-effectiveness. Major subordinate commands of the Army Materiel Command use some form of Army-approved variant thereof. Narrative cost-benefit analyses are permissible in some instances.

7.1.3.2 Navy

SECNAVINST 4330.17 directs the implementation of DFARS Subpart 246.7 for Navy programs. Specific implementation procedures are left to the discretion of weapon system acquisition activities. The conduct of warranty cost-benefit analyses must adhere to the policy and guidelines established for cost-benefit and life-cycle cost analyses in Economic Analysis Program Evaluation for Navy Resource Management, SECNAVINST 7000.14B, 18 June 1975. The Navy has sponsored research studies in the area of warranty cost-benefit analysis procedures.

7.1.3.3 Air Force

The Air Force published instructions for weapon system warranty cost-benefit analyses in AFR 70-11. AFR 173-15 contains guidance for the cost-benefit analysis as well as the timing of analysis updates. The PPAC developed the microcomputer-based Decision Support System (DSS) which, along with other generic models, is still in use.

7.1.3.4 Marine Corps

MCO 4105.2 mandates use of a cost-benefit analysis to support acquisition of a proposed weapon system warranty. The Marine Corps uses the Marine Corps Cost Analysis Strategy Assessment (MCCASA) as a formal tool to evaluate weapon system warranty cost-effectiveness.

7.2 COST-BENEFIT ANALYSIS PROCEDURES

The following subsections discuss procedures to conduct a cost-benefit analysis to determine the cost-effectiveness of a warranty. Each service has its own peculiarities insofar as the conduct of cost-benefit analyses is concerned. The purpose of this text is

simply to identify the objective, methodology, and information requirements attendant to virtually all cost-benefit analyses. The specific warranty cost-benefit model to be used may be obtained from the appropriate warranty focal point if not already available.

7.2.1 Framework of Analysis

This subsection presents a simple framework to conduct a warranty cost-benefit analysis. The time value of money and inflation factors are ignored in this example for the sake of simplicity. Service models incorporate these as an appropriate basis for analysis. Given:

LCC	=	life-cycle cost—the cost to acquire and operate a system over its lifetime
WCB	=	warranty cost benefit

The WCB is defined as follows:

(1) $WCB = LCC_{NW} - LCC_{W}$

where

LCC_{NW}	=	life-cycle cost with no warranty
LCC_{W}	=	life-cycle cost with warranty

If LCC is the only decision metric, then WCB must be positive (or at least not negative) for the warranty to be cost-effective. By segregating one more level of detail for LCC_{W}, a basis can be established for evaluating warranty price:

(2) $LCC_{W} = WP + LCC_{\bar{WP}}$

where

WP	=	warranty price
$LCC_{\bar{WP}}$	=	life-cycle cost exclusive of warranty price

Combining equations (1) and (2):

$$WCB = LCC_{NW} - (WP + LCC_{\bar{WP}})$$

(3) $$WCB = LCC_{NW} - WP - LCC_{\bar{WP}}$$

Since the break-even point for warranty cost-effectiveness occurs when WCB = 0, the maximum possible price to pay may be derived from equation (3) as

(4) $WP_{max} = LCC_{NW} - LCC_{\bar{WP}}$

7.2.2 Analysis Performance

DFARS Subsection 246.770-7 provides specific ground rules to conduct warranty cost-benefit analyses, tailor warranty terms and conditions for cost-effectiveness, examine a system's life-cycle costs (both with and without a warranty), and document analyses results in contract files. These topics are discussed in the following subsections.

7.2.2.1 Tailoring Warranty Terms and Conditions

DFARS Subsection 246.770-3, which recognizes that the objectives and circumstances vary considerably among weapon system acquisition programs, provides latitude in warranty construction. Consequently, program managers may tailor weapon system warranties on case-by-case bases, including remedies, exclusions, limitations, and duration, provided they are consistent with DFARS Subsection 246.770-3. Contracting officers may exercise these options, as appropriate, to derive cost-effective warranties in light of the technical risk, contractor financial risk, or other program uncertainties. Program managers and contracting officers may either construct broader, more comprehensive warranties or narrow the scope of warranties, as long as it is advantageous to do so, in accordance with prescribed policies, and within the bounds of legal propriety. Along these lines, the contractor should not be held liable for EPRs attendant to a design for which he is not responsible, unless the contractor specifically elects to assume such responsibility in writing.

7.2.2.2 Factors Affecting Analysis Techniques

It is necessary to recognize that the techniques and methods used to conduct a cost-benefit analysis of a warranty may vary, depending on the following factors:

- Type of warranty.
- Type of weapon system.
- Terms and conditions exercised by the contracting officer (remedies, exclusions, limitations, duration, financial and technical risk, and other uncertainties).
- EPRs and their measurability (the extent to which they can be quantified, such as MTBF and other statistical measures of reliability).
- Identification and measurability of acquisition and administrative costs.

7.2.2.3 Systems Life-Cycle Cost Examination

DFARS Subsection 246.770-7 suggests that expected benefits from the warranty should be compared with warranty acquisition and administration costs. The analysis should examine the expected costs for the warranty versus the cost expected if the weapon system were supported under normal organic support conditions or possibly contractor support services. If the program manager/contracting officer does not consider a specific

warranty proposition cost-effective, a waiver request should be initiated under DFARS Subsection 246.770-8.

7.2.2.4 Analysis Results Documentation

DFARS Subsection 246.770-7 requires that the warranty cost-benefit analysis be documented and made a part of the contract file. Documentation should identify data sources and explicitly present the methodology and approach used to estimate costs and benefits over the life of the weapon system. Documentation should be sufficiently complete so that another analyst could reperform the procedure and reproduce the same results.

7.3 GENERAL APPROACH TO WARRANTY COST-BENEFIT ANALYSIS

This section presents a general approach to conduct a warranty cost-benefit analysis. For any given procurement, there may be several warranty variants, each with multiple decision variables, to consider. The duration of the warranty, for example, is a decision variable. Furthermore, an incentive warranty may necessitate a choice between MTBF guarantee or RIW. Accordingly, a complete warranty cost-benefit analysis should consider a number of competing alternatives. The corresponding warranty cost-benefit for each alternative should be estimated to facilitate an appropriate program decision. Figure 7-1 depicts a general approach to warranty cost-benefit analysis. It is assumed that warranty price may be negotiated after an estimated warranty cost-benefit is determined. Selection of warranty variants and parameters may, however, be an iterative process during price negotiation should contractor perceptions and assumptions differ materially from those of the Government.

7.4 SIMPLIFIED WARRANTY PRICE-ANALYSIS PROCEDURE

This section presents a simplified procedure to analyze warranty price in a cost-benefit analysis. The procedure is based on the assumption that failures which occur during the warranty will be the responsibility of the contractor—either through contractor repair or buy-back. Therefore, the analysis compares savings in repair costs with warranty price. The steps are as follows:

Step 1: Calculate the expected system usage (SU) over the warranty period, using operating hours, cycles, miles, or other appropriate increments.

Step 2: Estimate the average MTBF for the warranty period, using mean hours, mean cycles, mean miles, or other appropriate units.

Step 3: Calculate the number of expected failures (EF) from the equation.

$$EF = \frac{SU}{MTBF}$$

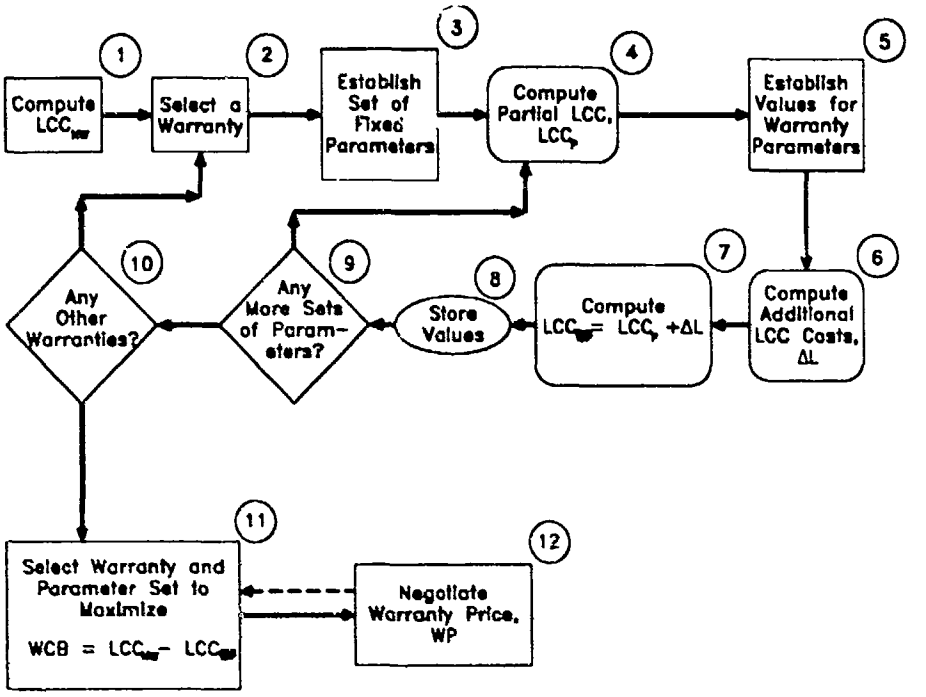

Figure 7-1: Cost-Benefit Decision Steps

1. Compute all costs to acquire and operate the system for a selected life-cycle period (LCC_{NW}). Assume no warranty is included in the contract.
2. Consider factors related to the system, acquisition environment, and program objectives, then select a candidate warranty form.
3. Establish set of fixed parameters or values to use in the LCC analysis that are independent of the warranty terms and conditions (e.g., military labor rates for maintenance).
4. Compute partial life-cycle costs (do not vary with the warranty terms and conditions).
5. Select a set of specific warranty terms and establish values to use in the LCC calculation.
6. Compute the additional LCC values related to warranty implementation.
7. Add the values obtained in steps 4 and 6 to compute total LCC exclusive of warranty price.
8. Store parameter set and LCC value used for final selection.
9. Vary applicable warranty parameters and repeat steps 4 through 8.
10. Select another feasible warranty form and repeat steps 3 through 9.
11. Compute warranty cost-benefit for each alternative. Select the alternative that maximizes benefit prior to price.
12. Use previous results to negotiate and establish a fair warranty price. Iterate as necessary.

Step 4: Estimate Government cost to correct each failure without a warranty (FC_{NW}).

Step 5: Estimate Government cost to process each failure under the warranty (FC_W), such as organizational maintenance, data, and shipping costs.

Step 6: Estimate the total of all other costs (OC) to the Government that are expected as a result of the warranty, excluding warranty price. This category includes warranty administration and transition costs.

Step 7: Estimate all other costs that will be saved (SC) through having the warranty, such as deferred purchase of test equipment and deferred training. Do not include the direct cost to process and repair failures.

Step 8: Calculate the warranty break-even price (WP_{BE}) as follows:

$$WP_{BE} = (EF \times (FC_{NW} - FC_W)) - OC + SC$$

For a price of WP_{BE}, the expected costs to the Government are the same with and without a warranty. Assume a system considered for failure-free warranty has an expected MTBF of 1,000 hours. Five hundred systems will be purchased and operate an average of 50 hours per month. Government cost to process each failure without a warranty is estimated to be $1,200. A warranty of 24 months is under consideration, which requires the contractor to repair all covered failures. With such a warranty, the Government estimates it will cost the Government $300 per failure to effect repairs and $75,000 to administer the warranty, and it will save $100,000 in deferred training and deferred purchase of special-purpose test equipment. The steps to be performed are as follows:

Step 1: The expected system usage is

SU = 500 systems x 50 hrs/mth x 24 mths

SU = 600,000 hrs

Step 2: The average MTBF over the 24-month period is 1,000 hours.

MTBF = 1,000 hrs

Step 3: The expected number of failures is:

EF = SU/MTBF

EF = 600,000/1,000

EF = 600

Step 4: The cost to the Government to process each failure without a warranty is given as $1,200.

FC_{NW} = $1,200

Step 5: The cost to the Government to process each failure under the warranty is given as $300.

FC_W = $300

Step 6: Other expected costs related to the warranty are given as $75,000.

$OC = \$75,000$

Step 7: Savings due to the warranty are given as $100,000.

$SC = \$100,000$

Step 8: The break-even warranty price is then

$WP_{BE} = (EF \times (FC_{NW} - FC_W)) - OC + SC$

$WP_{BE} = (600 \times (\$1,200 - \$300)) - \$75,000 + \$100,000$

$WP_{BE} = \$565,000$

These calculations show that if the price for the warranty is $565,000 or less, there is a net projected saving to the Government as a result of purchasing the warranty. The program manager should then bounce this figure against an internally contrived "efficiency index" (0% to 100%) to account for "shrinkage." Since no operation unfolds precisely as planned, only a portion of valid warranty claims are going to actually bubble through the system and be processed. Actual program experiences reveal that the percentage of valid warranty claims processed has run from 0% to 100%. Using an optimistic 80%, for example, the estimated WP_{BE} becomes $452,000. A procedure of this type is simplistic; however, it provides a projection of the potential cost-benefit to be gained by a warranty. Specific limitations to this illustration are as follows:

- The procedure does not directly consider the time value of money. If the warranty price is paid with system delivery, but the savings will occur in the future, appropriate discounting procedures should be employed.
- A conservative assumption is made that the MTBF is the same with or without a warranty. Generally, for warranties with incentive features, MTBF is expected to improve with a warranty because of the inherent motivation provided to the contractor to retain warranty dollars as profit.
- The required estimates for usage time, processing costs, and other costs are shown as single values, but in reality may require complex procedures and a relevant database to obtain reasonable estimates.
- The intangible benefits and disadvantages of a warranty are not considered. Principally, a warranty may provide protection against paying to correct a systemic problem that requires redesign. On the other hand, it may also cause some loss of self-sufficiency if the contractor is the only source of repair.

This relatively simple procedure can provide a convenient way to evaluate the sensitivity of the warranty price to one or more parameters, all other things being equal. Figure 7-2 reflects break-even prices across a broad range of MTBFs. Virtually all the service models facilitate this level of sensitivity analysis. This data can also be useful in assessing the benefits and effectiveness at the conclusion of the warranty.

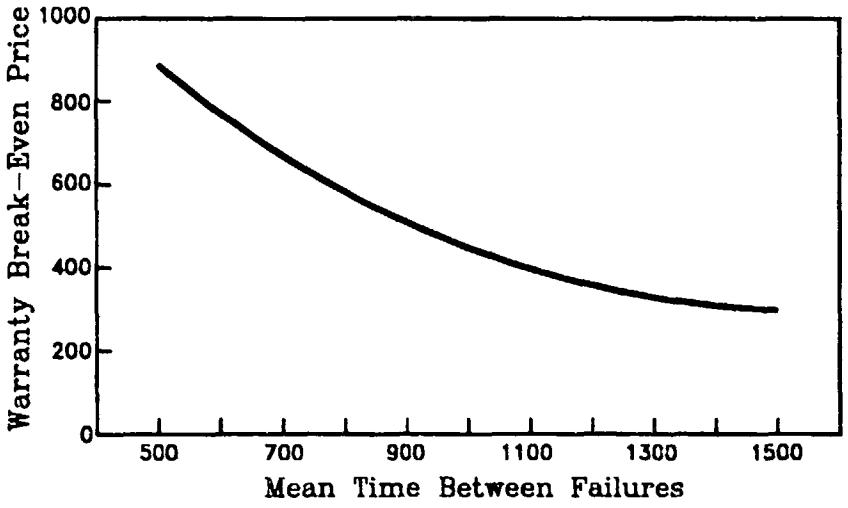

Figure 7-2: Break-Even Price vs MTBF

7.5 WARRANTY COST ELEMENTS

There are numerous Government costs to consider in a warranty cost-benefit analysis per DFARS Subsection 246.770-7. To evaluate the cost-effectiveness of a warranty accurately, it is necessary to identify and consider cost elements that may have a material impact on system life-cycle cost. These cost elements may be obtained for both the no-warranty and warranty cases, or incrementally. Table 7-1 highlights cost considerations. The following subsections provide examples of direct as well as indirect cost elements.

7.5.1 Direct Cost Elements

The following subsections define and discuss various Governmental cost elements resident in analyses of warranty cost-effectiveness from a life-cycle-cost perspective.

7.5.1.1 Warranty Price

Warranty price includes the price paid to the contractor to supply the warranty and associated data products. The contractor can be expected to include the costs of all resources (including overhead) required to meet obligations under the warranty provisions in the contract. These costs may be augmented by profit and risk/uncertainty considerations (safety factor), which represent the contingent nature of future warranty liabilities, to determine the final warranty price.

Table 7-1

WARRANTY COST CONSIDERATIONS

Reliability	· MTBF · Reliability growth
Maintainability	· MTTR · Special skills · No evidence of failures
Readiness	· Availability · Consignment spares
Logistics Flow	· Pipeline and storage times · Turnaround times · Spare quantities
Initial Acquisition Cost	· Unit cost · Test equipment cost · Training cost · Data cost
Support Cost	· Support per operating hour · Spares cost · Maintenance labor cost · Warranty administration cost · Shipping cost · Facility cost
Contract Adjustment	· Warranty duration · Turnaround time
Transition Cost	· Facility cost · Retraining cost · Test equipment cost · Inventory cost

To evaluate a contractor's proposed warranty price, due consideration must be given to two public laws: P.L. 87-653, Cost and Pricing Data Requirements, and P.L. 91-379, Cost Accounting Standards. Under the disclosure requirements of P.L. 87-653, the contractor is responsible to substantiate the proposal with current, accurate, and complete cost and pricing data. This requirement extends to the warranty price as well as to all other elements of the proposal. Requirements of P.L. 91-379 also need be considered. Any question as to whether a proposal properly complies with the contractor's disclosure statement and approved accounting procedures should be pursued with the contractor and, if necessary, the contract administration office, to ensure compliance.

7.5.1.2 Warranty Development

The warranty development cost includes the Government program development and management costs to obtain cost-effective warranties in weapon system procurements. These costs may include the following activities:

- Strategy planning between contracts, engineering, and logistics personnel to determine EPRs and tailor warranties on a system-by-system basis.
- Cost-benefit analyses to determine warranty cost-effectiveness.
- Negotiations with contractors to definitize warranty language.

Development of databases and models from various past warranties of similar systems may aid in warranty performance and cost trade-off decisions.

7.5.1.3 Equipment Maintenance

The equipment maintenance costs include the labor, material, and transportation costs incurred by the Government for all preventive and corrective maintenance not performed by the contractor under the warranty. Preventive maintenance may include a resident staff that performs periodic maintenance as well as a traveling staff that performs any special maintenance on a periodic basis. Corrective military maintenance may consist of organizational, intermediate, or depot maintenance costs:

- Labor and material for fault verification and module replacement.
- Shipping and depot labor and material for systems/modules that are not reparable at the post or station.
- Replacement costs for condemned reparable modules.

For warranty purposes, the costs may further include:

- Fault-verification labor costs and incidental materials.
- Cost of shipping systems to and from the contractor if the Government pays for shipping.

7.5.1.4 Redesign

Redesign costs include the labor and material redesign and retrofit costs required for the system and component parts to conform to specified EPRs. These costs may include:

- Engineering analysis to determine causes of nonconforming systems.
- Corrective engineering design and drawing changes.

- Modification of systems, spare systems, or spare parts.
- Retest, retrofit, and configuration management activities.

Normally, the bulk of redesign costs will be borne by the contractor under the terms of a warranty if no "liability cap" is specified in the contract. Without a warranty, these costs are borne by the Government.

7.5.1.5 Test Equipment

These costs are attributable test equipment required to support the weapon system. If the contractor repairs all failures, less Government intermediate and depot-level special-purpose test equipment may be required for the warranty case than no-warranty case. However, during transition from warranty to organic repair, additional test equipment may be required.

7.5.1.6 Test Equipment Support

The test-equipment support costs embody operation and maintenance of test equipment.

7.5.1.7 Initial/Replenishment Spares

Initial/replenishment spares costs include the material costs of spares and modules to support the various pipelines. In the event that system reliability fails to meet stated levels during the warranty coverage, additional spares may be required to relieve potential pipeline shortages.

7.5.1.8 Training

Training costs include costs to train personnel to operate, support, and maintain the equipment. They also include training costs for warranted equipment handling and support, as well as training costs for transition from warranty to organic maintenance.

7.5.1.9 Data

Data costs include the cost to purchase data associated with the operation, maintenance, and support of equipment and test equipment. Depending on the warranty form, the Government may incur additional costs to purchase data not previously supplied.

Warranty performance data may also be required, including the labor, computer, and material costs to develop and maintain a data system to meet warranty data collection and analysis requirements. These efforts may include the following:

- Data collection and analysis to accumulate, process, analyze, and report the warranty information.
- Warranty data reports containing records that relate to population size, configuration, and repair history.
- Effectiveness evaluations containing warranty experiences and conclusions regarding the effectiveness of the warranty concept.

In addition, it is necessary to update any affected data, including drawings and technical documents, to reflect changes in failed items. Program managers may want to consider receipt of warranty data in magnetic form which can be imported into an appropriate database for ease of manipulation. This can obviate the time and expense necessary to essentially "reenter" data so that it may be locally processed in response to various inquiries. Some of the standard DIDs cited in contract data requirements lists (CDRLs) have generated mounds of data, but little relevant information.

7.5.1.10 Inventory Management

Inventory management costs include the costs to the Government to manage items in inventory. Only those items (parts, modules, systems) which are unique to the warranted system are included. The level and frequency of repair will dictate the intensity of inventory management.

7.5.1.11 Administration and Enforcement

The administration and enforcement costs include labor and material costs for Government personnel to manage the warranty. The necessary warranty functions performed include liaison between the program, support, user, and contractor activities to do the following:

- Report, coordinate, and process warranty claims.
- Handle, store, and transport warranted systems.
- Manage integrated logistics support and configuration management of warranted systems.
- Determine warranty compensation.

This cost element is typically treated as a "delta" or incremental cost when compared with the no-warranty case. It is almost always significant. Most warranty administration positions are not "organic" and are essentially funded or staffed "out of hide." Program managers should resist any notion that warranty administration will autoexecute—it will not. Indeed, the paucity and cost of warranty administrative and enforcement resources may mandate that claims below certain dollar thresholds not be processed at all. It makes little sense to spend $300 processing a $50 claim.

7.5.2 Indirect Cost Elements

There are other warranty cost elements that are less amenable to modeling, but could have a major influence on system life-cycle cost. These are indirect cost elements. Because these elements represent risks and variables not easily accounted for, especially without a large database, it may be necessary to apply engineering judgment to evaluate their influence on system life-cycle cost. This is particularly true if contractor costs to protect against perceived risks in one form or another are included. The following subsections discuss indirect cost elements.

7.5.2.1 Competition

A reduction in competition may result if warranty requirements, primarily EPRs, present a high financial risk. The potential liability for system failures would be too great for some contractors to assume and they would withdraw from competition rather than face risks of "going concern" proportions. This could so reduce competition in the procurement process as to result in higher system acquisition costs for the Government. Competition for follow-on production may also be reduced if the contractor has an established warranted system repair facility that has been amortized to such an extent that it would blockade a new entrant from competition.

A further reduction in competition may occur if parts to maintain the system must be procured from the contractor that supplies the warranty. Usage of parts from other sources could void the warranty coverage if the terms and conditions are not carefully constructed.

7.5.2.2 Breakout

A decreased opportunity for breakout may occur as a result of warranty application. This could also lead to increased cost. In the past, program managers have obtained significant cost savings by direct procurement and provision of selected ("broken out") assemblies to the system contractor as Government-furnished equipment (GFE). With warranties, however, program managers may find that the practice of breakout causes very difficult problems in resolving system failures, such as fault isolation, responsibility, and liability. Warranties may significantly reduce the amount of breakout and subsequent cost savings to the Government unless this issue is directly addressed in the contract to avoid such limitations.

7.5.2.3 Warranty Default

Warranty obligations may not be fulfilled due to litigation on liability for system failures or material monetary losses by the contractor. Consequently, the Government may have to face the risk of correcting system failures without recourse. The costs to the Government in this regard could be significant.

7.5.2.4 Technology

Use of advanced technologies in system design may be suppressed if contractors are fearful of potential warranty reprisals and opt for older, but proven technology to reduce future system failure risks.

7.5.2.5 Readiness

Warranties may affect readiness. For example, time consumed by contractor field services or return of systems to the contractor facility may directly decrease system readiness. Therefore, the impact on system life-cycle cost to maintain readiness should be evaluated in warranty cost-benefit analyses. One alternative is to have additional spare systems (floats) available in the field or supply pipelines to decrease system downtime. The acquisition and added support costs of such additional spares should then be incorporated into the cost-benefit analyses.

7.6 WARRANTY BENEFITS

Warranty benefits, both quantitative as well as qualitative, must be identified and defined. A well-constructed warranty provides increased assurance that intended operational performance is attained. In some cases this assurance can be quantified through the use of reliability and maintainability parameters such as MTBF and MTTR. This is particularly true when the warranty includes guaranteed performance levels of such parameters as those mentioned. Clearly, increased reliability means fewer failures. Fewer failures means fewer hits on the supply system and reduced maintenance man hours. The number of failures directly influences repair parts inventories, maintenance manpower levels, training requirements, materials costs for repair, and other logistics and support elements associated with failures. Consequently, these types of warranty benefits can be translated into statistical measures of benefits and associated costs in the conduct of a cost-benefit analysis.

Benefits which are not quantifiable in terms of direct cost savings may include:

- Quality engineering design emphasis that materially decreases failures and attendant maintenance costs.
- Use of warranty requirements to "screen" contractors who are incapable of producing sufficiently reliable systems.
- Focus on measurements of field system performance through warranties instead of development phase performance.
- Early and rapid problem resolution with incentives for no-cost ECPs.
- Realistic estimates of field performance during proposal negotiations.

Nonquantifiable benefits should be identified in precise terms and compared to the required resources so that they may be factored into selection of the most cost-effective alternative.

7.7 DoD WARRANTY COST MODEL LIMITATIONS

The redesign responsibility placed on the contractor is intrinsically the most effective remedy available to achieve the required performance requirements of 10 USC 2403. However, it can be difficult to factor redesign into the analyses. If the contractor foresaw a likelihood to confront a redesign effort, would he not effect the design change in the first place? However, without a redesign clause, existing cost-benefit models are often reduced, in reality, to fixed-price repair analyses. Who can fix it more cheaply? Will the Government get more or less repairs for its money than bargained for? The bottom line is that the warranty ends up not assuring reliability or a performance level, but assuring the weapon system will be restored to its same deficient status. Program managers must supplement these models with due professional care (judgement) to protect the Government from undue engineering redesign costs.

If there is a fatal flaw to cost-benefit analyses, it is the myopic focus, especially by Government auditors, on cost against cost versus cost against benefit. Suppose the Government paid $100,000 out of a contract price of $100,000,000 for a three-year, failure-free warranty for which 1,000 failures were expected to occur and be repaired by the contractor. Further assume that no failures transpired. A strict bean count, quite naturally, would conclude that the warranty was not cost-effective. In reality, quite the opposite is true. The very best warranty is one for which no claim need ever be exercised.

CHAPTER EIGHT

LESSONS LEARNED

Since enactment of 10 USC 2403 the services have generally taken a "transactional" approach to weapon system warranties as opposed to a "transformational" approach. The majority of warranties have taken the form of either "zero defects" or "expected failure thresholds" and focused on failure calculations and repair actions. The transactional approach met with limited success due to the myriad reasons cited herein. The "systemic" concept, however, is gaining in popularity, either as a stand-alone warranty or integrated with other forms, for the number of reasons cited herein. The following sections highlight composites of additional lessons learned since the inception of 10 USC 2403.

8.1 WARRANTY PLANNING

• Warranty planning cannot begin too early. The warranty must be consistent and compatible with operational and logistics concepts and with the overall acquisition strategy. Weapon system users and supporting agencies should be involved throughout the planning process.

• Warranty contract clauses and the warranty plan should be developed concurrently. Otherwise it is too easy to overlook warranty administration implications.

8.2 WARRANTY DURATION

• Warranty durations should be reasonably long enough to identify potential weapon system deficiencies in the post-acceptance period while covered by the warranties.

8.3 WARRANTY WAIVERS

• A sound cost-benefit analysis that indicates a warranty will not be cost-effective is reason for recommendation of a waiver. It is not a reason to generate new figures merely to "justify" procurement of a warranty. Mature, proven designs should clearly summon either reduced warranty prices or the waiver process.

• A warranty whose provisions place undue burdens on the weapon system user and support communities is a prime candidate for a waiver.

8.4 WARRANTY STRATEGY

• Keep the overall intent of the warranty in focus. If reliability is the EPR, analyze the proposed warranty carefully to ensure it provides precisely the intended incentive and does not, for example, make it financially attractive for the contractor to provide additional spares rather than meet or exceed design reliability requirements.

8.5 WARRANTY CONTRACTING

• Whenever possible, plan to obtain warranties under competitive conditions. Avoid obtaining warranties on cost reimbursable contracts.

• Plan for contract provisions that facilitate termination of warranty provisos, at no cost to the Government, for a reasonable period (six months) following award. Alternatively, Section B of the RFP could contain a separate CLIN requiring the contractor(s) to propose a priced warranty as a deliverable item. Such provisions "buy time" to finalize cost-benefit analyses and process waivers, if appropriate.

• Avoid changes to contract warranty clauses during negotiations without coordination with all potentially affected parties. Uncoordinated changes may lead to ineffective, unenforceable warranties.

8.6 WARRANTY ADMINISTRATION

• Avoid establishment of "warranty only" tasks. Connect warranty administration and enforcement tasks with routine maintenance and supply actions.

• Identify warranted systems in both field and depot technical publications to prevent confusion. Minimize warranty-driven changes to technical publications.

• Keep warranty administration procedures consistent and simple. A warranty is not cost-effective if it requires innumerable man-hours just to process a small claim. The more complicated the process, the more likely it will not be done correctly and the benefits of the warranty will not be realized. "Make it simple to do it right."

• Selective issue of warranted assets is not feasible. Requirements to issue warranted assets before nonwarranted assets from base and depot warehouses exponentially increases overhead and administrative costs.

8.7 WARRANTY TESTING

• A warranty-unique field procedure which cannot be avoided should be realistically evaluated to determine its effect on field maintenance and operations. Conversely,

realistic maintenance and operations procedures should be evaluated to determine if they could invalidate the warranty.

- Ensure that warranty EPRs are realistically testable or measurable and reportable.

8.8 WARRANTY DATA TRACKING

- The program manager should have a thorough understanding of the capabilities and shortfalls of service supply and maintenance systems and related data collection systems if they will be used to track warranted equipment. Except for a few weapon specific systems, the services' current data collection systems do not provide significant abilities to track individual systems.

- Avoid requirements for manual extraction and transcription of large amounts of warranty-required data from service maintenance forms or maintenance data collection systems. Such requirements create intolerable administrative burdens.

- Any decision to use deficiency tracking reports (SRs, QDRs, EIRs, and the like) to process warranty claims should not be taken lightly. Such use can place an undue burden on field activities and overwhelm logistics managers with concerns the aforementioned reports were never intended to address. One individual report can require hours to prepare and many additional hours to process.

- Population serial number tracking has proven neither practical nor cost-effective for warranty identification.

8.9 WARRANTY MARKING

- The use of labels is only marginally effective for warranty identification. If labels are used, they should be placed in conspicuous, accessible locations—not hidden on the inside of systems, on removable items such that actual removal for repair or replacement renders the remaining system unmarked, or on the packaging (Reference 19).

APPENDIX A

TITLE 10, § 2403, UNITED STATES CODE

§ 2403. Major weapon systems: contractor guarantees

(a) In this section:

"(1) "Weapon system" means items that can be used directly by the armed forces to carry out combat missions and that cost more than $100,000 or for which the eventual total procurement cost is more than $10,000,000. Such term does not include commercial items sold in substantial quantities to the general public.

(2) "Prime contractor" means a party that enters into an agreement directly with the United States to furnish part or all of a weapon system.

(3) "Design and manufacturing requirements" means structural and engineering plans and manufacturing particulars, including precise measurements, tolerances, materials, and finished product tests for the weapon system being produced.

(4) "Essential performance requirements", with respect to a weapon system, means the operating capabilities or maintenance and reliability characteristics of the system that are determined by the Secretary of Defense to be necessary for the system to fulfill the military requirement for which the system is designed.

(5) "Component" means any constituent element of a weapon system.

(6) "Mature full-scale production" means the manufacture of all units of a weapon system after the manufacture of the first one-tenth of the eventual total production or the initial production quantity of such system, whichever is less.

(7) "Initial production quantity" means the number of units of a weapon system contracted for in the first year of full-scale production.

(8) "Head of an agency" has the meaning given that term in section 2302 of this title [10 USC § 2302].

(b) Except as otherwise provided in this section, the head of an agency may not after January 1, 1985, enter into a contract for the production of a weapon system unless each prime contractor for the system provides the United States with written guarantees that—

(1) the item provided under the contract will conform to the design and manufacturing requirements specifically delineated in the production contract (or in any amendment to that contract);

(2) the item provided under the contract, at the time it is delivered to the United States, will be free from all defects in materials and workmanship;

(3) the item provided under the contract will conform to the essential performance requirements of the item as specifically delineated in the production contract (or in any amendment to that contract); and

(4) if the item provided under the contract fails to meet the guarantee specified in clause (1), (2), or (3), the contractor will at the election of the Secretary of Defense or as otherwise provided in the contract—

(A) promptly take such corrective action as may be necessary to correct the failure at no additional cost to the United States; or

(B) pay costs reasonably incurred by the United States in taking such corrective action.

(c) The head of the agency concerned may not require guarantees under subsection (b) from a prime contractor for a weapon system, or for a component of a weapon system, that is furnished by the United States to the contractor.

(d) Subject to subsection (e)(1), the Secretary of Defense may waive part or all of subsection (b) in the case of a weapon system, or component of a weapon system, if the Secretary determines—

(1) that the waiver is necessary in the interest of national defense; or

(2) that a guarantee under that subsection would not be cost-effective.

The Secretary may not delegate authority under this subsection to any person who holds a position below the level of Assistant Secretary of Defense or Assistant Secretary of a military department.

(e)(1) Before making a waiver under subsection (d) with respect to a weapon system that is a major defense acquisition program for the purpose of section 139a of this title [10 USCS § 139a], the Secretary of Defense shall notify the Committees on Armed Services and on Appropriations of the Senate and House of Representatives in writing of his intention to waive any or all of the requirements of subsection (b) with respect to that system and shall include in the notice an explanation of the reasons for the waiver.

(2) Not later than February 1 of each year, the Secretary of Defense shall submit to the committees specified in paragraph (1) a report identifying each waiver made under subsection (d) during the preceding calendar year for a weapon system that is not a major defense acquisition program for the purpose of section 139a of this title [10 USCS § 139a] and shall include in the report an explanation of the reasons for the waivers.

(f) The requirement for a guarantee under subsection (b)(3) applies only in the case of a contract for a weapon system that is in mature full scale production. However, nothing in this section prohibits the head of the agency concerned from negotiating a guarantee similar to the guarantee described in that subsection for a weapon system not yet in mature full-scale production. When a contract for a weapon system not yet in mature full-scale production is not to include the full guarantee described in subsection (b)(3), the Secretary shall comply with the notice requirements of subsection (e).

(g) Nothing in this section prohibits the head of the agency concerned from—

(1) negotiating the specific details of a guarantee, including reasonable exclusions, limitations and time duration, so long as the negotiated guarantee is consistent with the general requirements of this section;

(2) requiring that components of a weapon system furnished by the United States to a contractor be properly installed so as not to invalidate any warranty or guarantee provided by the manufacturer of such component to the United States;

(3) reducing the price of any contract for a weapon system or other defense equipment to take account of any payment due from a contractor pursuant to subclause (B) of subsection (b)(4);

(4) in the case of a dual source procurement, exempting from the requirements of subsection (b)(3) an amount of production by the second source contractor equivalent to the first one-tenth of the eventual total production by the second source contractor; and

(5) using written guarantees to a greater extent than required by this section, including guarantees that exceed those in clauses (1), (2), and (3) of subsection (b) and guarantees that provide more comprehensive remedies than the remedies specified under clause (4) of that subsection.

(h)(1) The Secretary of Defense shall prescribe such regulations as may be necessary to carry out this section.

(2) This section does not apply to the Coast Guard or to the National Aeronautics and Space Administration.

(Added Oct. 19, 1984, P. L. 98-525, Title XII, Part C, § 1234(a) in part, 98 Stat. 2601.)

APPENDIX B

DEFENSE FEDERAL ACQUISITION REGULATION SUPPLEMENT
SUBPART 246.7

SUBPART 246.7--WARRANTIES

246.701 Definitions.

"Acceptance," as defined in FAR 46.701 and as used in this subpart and in the warranty clauses at FAR 52.246-17, Warranty of Supplies of a Noncomplex Nature; FAR 52.246-18, Warranty of Supplies of a Complex Nature; FAR 52.246-19, Warranty of Systems and Equipment Under Performance Specifications or Design Criteria; and FAR 52.246-20, Warranty of Services, includes the execution of an official document (e.g., DD Form 250, Material Inspection and Receiving Report) by an authorized representative of the Government.

"Defect," as used in this subpart, means any condition or characteristic in any supply or service furnished by the contractor under the contract that is not in compliance with the requirements of the contract.

246.702 General

(c) Departments and agencies shall establish procedures to track and accumulate data on warranty costs.

246.703 Criteria for use of warranties.

The use of warranties in the acquisition of weapon systems is mandatory (10 U.S.C. 2403) unless a waiver is authorized (see 246.770-8).

(b) *Cost.*
Contracting officers may include the cost of a warranty as part of an item's price or as a separate contract line item.

246.704 Authority for use of warranties.

The chief of the contracting office must approve use of a warranty, except in acquisitions for--

(1) Weapon systems (see 246.770);

(2) Commercial supplies or services (see FAR 46.709);

(3) Technical data, unless the warranty provides for extended liability (see 246.708);

(4) Supplies and services in fixed price type contracts containing quality assurance provisions that reference MIL-I-45208, Inspection System Requirement, or MIL-Q-9858, Quality Program Requirements; or

(5) Supplies and services in construction contracts when using the warranties that are contained in Federal, military, or construction guide specifications.

246.705 Limitations.

(a) Warranties in the clause at 252.246-7001, Warranty of Data, are also an exception to the prohibition on use of warranties in cost-reimbursement contracts.

246.706 Warranty terms and conditions.

(b)(5) *Markings.*
Use MIL Standard 129, Marking for Shipments and Storage, and MIL Standard 130, Identification Marking of U.S. Military Property, when marking warranty items.

246.708 Warranties of data.

Obtain warranties on technical data when practicable and cost effective. Conside. the factors in FAR 46.703 in deciding whether to obtain warranties of technical data. Consider the following in deciding whether to use extended liability provisions--

(1) The likelihood that correction or replacement of the nonconforming data, or a price adjustment, will not give adequate protection to the Government; and

(2) The effectiveness of the additional remedy as a deterrent against furnishing nonconforming data.

246.710 Contract clauses.

(1) Use a clause substantially the same as the clause at 252.246-7001, Warranty of Data, in solicitations and contracts that include the clause at 252.227-7013, Rights in Technical Data and Computer Software, and there is a need for greater protection or period of liability than provided by other contract clauses, such as the clauses at--

(i) FAR 52.246-3, Inspection of Supplies--Cost-Reimbursement;

(ii) FAR 52.246-6, Inspection--Time-and-Material and Labor-Hour;

(iii) FAR 52.246-8, Inspection of Research and Development--Cost-Reimbursement; and

(iv) FAR 52.246-19, Warranty of Systems and Equipment Under Performance Specifications or Design Criteria.

(2) Use the clause at 252.246-7001, Warranty of Data, with its Alternate I when extended liability is desired and a fixed price incentive contract is contemplated.

(3) Use the clause at 252.246-7001, Warranty of Data, with its Alternate II when extended liability is desired and a firm fixed price contract is contemplated.

246.770 Warranties in weapon system acquisitions.

This section sets forth policies and procedures for use of warranties in contracts for weapon system production.

246.770-1 Definitions.

As used in this section--

(a) "At no additional cost to the Government" means--

(1) At no increase in price for firm fixed price contracts;

(2) At no increase in target or ceiling price for fixed price incentive contracts (see also FAR 46.707); or

(3) At no increase in estimated cost or fee for cost-reimbursement contracts.

(b) "Design and manufacturing requirements" means structural and engineering plans and manufacturing particulars, including precise measurements, tolerances, materials and finished product tests for the weapon system being produced.

(c) "Essential performance requirements" means the operating capabilities and maintenance and reliability characteristics of a weapon system that the agency head determines to be necessary to fulfill the military requirement.

(d) "Initial production quantity" means the number of units of a weapon system contracted for in the first program year of full-scale production.

(e) "Mature full-scale production" means follow-on production of a weapon system after manufacture of the lesser of the initial production quantity or one-tenth of the eventual total production quantity.

(f) "Weapon system" means a system or major subsystem used directly by the Armed Forces to carry out combat missions.

(1) The term includes, but is not limited to, the following (if intended for use in carrying out combat missions)--

(i) Tracked and wheeled combat vehicles;

(ii) Self-propelled, towed and fixed guns, howitzers and mortars;

(iii) Helicopters;

(iv) Naval vessels;

(v) Bomber, fighter, reconnaissance and electronic warfare aircraft;

(vi) Strategic and tactical missiles including launching systems;

(vii) Guided munitions;

(viii) Military surveillance, command, control, and communication systems;

(ix) Military cargo vehicles and aircraft;

(x) Mines;

(xi) Torpedoes;

(xii) Fire control systems;

(xiii) Propulsion systems;

(xiv) Electronic warfare systems; and

(xv) Safety and survival systems.

(2) The term does not include--

(i) Commercial items sold in substantial quantities to the general public (see FAR 15.804-3(c)); or

(ii) Spares, repairs, or replenishment parts; or

(iii) Related support equipment (e.g., ground-handling equipment, training devices and accessories, ammunition), unless an effective warranty would require inclusion of such items.

246.770-2 Policy.

(a) Under 10 U.S.C. 2403, departments and agencies may not contract for the production of a weapon system with a unit weapon system cost of more than $100,000 or an estimated total procurement cost in excess of $10 million unless--

(1) Each contractor for the weapon system provides the Government written warranties that--

(i) The weapon system conforms to the design and manufacturing requirements in the contract (or any modifications to that contract),

(ii) The weapon system is free from all defects in materials and workmanship at the time of acceptance or delivery as specified in the contract; and

(iii) The weapon system, if manufactured in mature full-scale production, conforms to the essential performance requirements of the contract (or any modification to that contract); and

(2) The contract terms provide that, in the event the weapon system fails to meet the terms of the above warranties, the contracting officer may--

(i) Require the contractor to promptly take necessary corrective action (e.g., repair, replace, and/or redesign) at no additional cost to the Government;

(ii) Require the contractor to pay costs reasonably incurred by the Government in taking necessary corrective action, or

(iii) Equitably reduce the contract price; or

(3) A waiver is granted under 246.770-8.

(b) Contracting officers may require warranties that provide greater coverage and remedies than specified in paragraph (a) of this subsection, such as including an essential performance requirement warranty in other than a mature full-scale production contract.

(c) When the contract includes an essential performance requirement warranty, the warranty must identify redesign as a remedy available to the Government.

(1) The period during which redesign must be available as a remedy shall not end before operational use, operational testing, or a combination of operational use and operational testing has demonstrated that the warranted item's design has satisfied the essential performance requirements.

(2) When essential performance requirements are warranted in contracts with alternate source contractors, do not include redesign as a remedy available to the Government under those contracts until the alternate source has manufactured the first ten percent of the eventual total production quantity anticipated to be acquired from that contractor (see 246.770-5).

246.770-3 Tailoring warranty terms and conditions.

(a) Since the objectives and circumstances vary considerably among weapon system acquisition programs, contracting officers must tailor the required warranties on a case-by-case basis. The purpose of tailoring is to get a cost-effective warranty in light of the technical risk, or other program uncertainties, while ensuring that the Government still acquires the basic warranties described in 246.770-2. Tailoring shall not be used as a substitute for acquiring a warranty waiver.

(1) Tailoring may affect remedies, exclusions, limitations, and duration provided such are consistent with the specific requirements of this section (see also FAR 46.706).

(2) Clearly relate the duration of any warranty to the contract requirements and allow sufficient time to demonstrate achievement of the requirements after acceptance.

(3) Tailor the terms of the warranty, if appropriate, to exclude certain defects for specified supplies (exclusions) or to limit the contractor's liability under the terms of the warranty (limitations).

(4) Structure broader and more comprehensive warranties when advantageous or narrow the scope when appropriate. For example, it may be inappropriate to require warranty of all essential performance requirements for a contractor that did not design the system.

(b) DoD policy is to exclude any terms that cover contractor liability for loss, damage, or injury to third parties from warranty clauses.

(c) Ensure acquisition of subsystems and components in a manner which does not affect the validity of the weapon system warranty.

246.770-4 Warranties on Government-furnished property.

Contracting officers shall not require contractors to provide the warranties specified in 246.770-2 on any property furnished the contractor by the Government, except for--

(a) Defects in installation;

(b) Installation or modification in such a manner that invalidates a warranty provided by the manufacturer of the property; or

(c) Modifications made to the property by the contractor.

246.770-5 Exemption for alternate source contractor(s).

Agency heads may exempt alternate source contractor(s) from the essential performance warranty requirements of 246.770-2(a)(1)(iii) until that contractor manufactures the first ten percent of its anticipated total production quantity.

246.770-6 Applicability to foreign military sales (FMS).

(a) The warranty requirements of 246.770-2 are not mandatory for FMS production contracts. DoD policy is to obtain the same warranties on conformance to design and manufacturing requirements and against defects in material and workmanship as it gets for U.S. supplies.

(b) DoD normally will not obtain essential performance warranties for FMS purchasers. However, where contracting officer cannot separately identify the cost for the warranty of essential performance requirements, the foreign purchaser shall be given the same warranty that the United States gets.

(c) If an FMS purchaser expressly requests a performance warranty in the letter of acceptance, the Government will exert its best efforts to obtain the same warranty obtained for U.S. equipment. Or, if specifically requested by the FMS purchaser, obtain a unique warranty.

(d) The costs for warranties for FMS purchasers may be different from the costs for such warranties for the Government due to factors such as overseas transportation and any tailoring to reflect the unique aspects of the FMS purchaser.

(e) Ensure that FMS purchasers bear all of the acquisition and administrative costs of any warranties.

246.770-7 Cost-benefit analysis.

(a) In assessing the cost effectiveness of a proposed warranty, perform an analysis which considers both the quantitative and qualitative costs and benefits of the warranty. Consider--

(1) Costs of warranty acquisition, administration, enforcement, and user costs, and any costs resulting from limitations imposed by the warranty provisions;

(2) Costs incurred during development specifically for the purpose of reducing production warranty risks;

(3) Logistical and operational benefits as a result of the warranty as well as the impact of the additional contractor motivation provided by the warranty.

(b) Where possible, make a comparison with the costs of obtaining and enforcing similar warranties on similar systems.

(c) Document the analysis in the contract file. If the warranty is not cost effective, initiate a waiver request under 246.770-8.

246.770-8 Waiver and notification procedures.

(a) The Secretary of Defense has delegated waiver authority within the limits specified in 10 U.S.C. 2403. The waiving authority for the defense agencies is the Assistant Secretary of Defense (Production and Logistics). The waiving authority for the military departments is the Secretary of the department with authority to redelegate no lower than an Assistant Secretary. The waiving authority may waive one or more of the weapons system warranties required by 246.770-2 if--

(1) The waiver is in the interests of national defense; or

(2) The warranty would not be cost effective.

(b) Waiving authorities must make the following notifications or reports to the Senate and House Committees on Armed Services and Appropriations for all waivers--

(1) *Major Weapon Systems.*
For a weapon system that is a major defense acquisition program for the purpose of 10 U.S.C. 2432, the waiving official must notify the Committees in writing of an intention to waive one or more of the required warranties. Include an explanation of the reasons for the waiver in the notice. Ordinarily provide the notice 30 days before granting a waiver.

(2) *Other Weapon Systems.*
For weapon systems that are not major defense acquisition programs for the purpose of 10 U.S.C. 2432, waiving officials must submit an annual report not later than February 1 of each year. List the waivers granted in the preceding calendar year in the report and include an explanation of the reasons for granting each waiver.

(3) *Weapon Systems Not in Mature Full-Scale Production.*
Although a waiver is not required, if a production contract for a major weapon system not yet in mature full-scale production will not include a warranty on essential performance requirements, the waiving officials must comply with the notice requirements for major weapon systems.

(c) Departments and agencies shall issue procedures for processing waivers, notifications, and reports to Congress.

(1) Requests for waiver shall include--

(i) A brief description of the weapon system and its stage of production, e.g., the number of units delivered and anticipated to be delivered during the life of the program;

(ii) Identification of the specific warranty or warranties required by 246.770-2(a)(1) for which the waiver is requested;

(iii) The duration of the waiver if it is to go beyond the contract;

(iv) The rationale for the waiver (if the waiver request is based on cost-effectiveness, include the results of the cost-benefit analysis);

(v) A description of the warranties or other techniques used to ensure acceptable field performance of the weapon system, e.g., warranties, commercial or other guarantees obtained on individual components; and

(vi) Exercise date of the warranty option, if applicable.

(2) Notifications and reports shall include--

(i) A brief description of the weapon system and its stage of production; and

(ii) Rationale for not obtaining a warranty.

(3) Keep a written record of each waiver granted and notification and report made, together with supporting documentation such as a cost-benefit analysis, for use in answering inquiries.

APPENDIX C

ARMY REGULATION 700-139

Headquarters
Department of the Army
Washington, DC
10 March 1986

*Army Regulation 700–139

Effective 10 April 1986

Logistics

Army Warranty Program Concepts and Policies

This UPDATE printing publishes a new regulation which is effective 10 April 1986. It supersedes Army Warranty Program AR 702–13, dated 1 February 1981, in its entirety.

By Order of the Secretary of the Army

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Summary. This regulation on the policies, responsibilities, and procedures of the Army Warranty Program has been revised in consonance with 10 USC 2403 and the Federal Acquisition Regulation System. This regulation covers mandatory weapon system warranties and other nonmandatory warranties. This regulation assigns responsibilities, states acquisition policies, defines information requirements, covers fielding and execution procedures, and prescribes methods of compliance.

Applicability. This regulation applies to the Active Army, the Army National Guard (ARNG), and the U.S. Army Reserve (USAR). This regulation applies to all Army acquired and managed items and non-Army acquired items used by the Army except—

a. Items purchased by nonappropriated funds.

b. Special intelligence property administered under AR 381–143.

c. Industrial production items.

d. Real property obtained or built by the Corps of Engineers.

e. Civil works activities of the Corps of Engineers.

f. Subsistence and clothing bought by the Defense Logistics Agency.

g. General Services Administration interagency motor pool vehicles and commercial design nontactical vehicles either purchased, leased, or rented.

h. Nonstandard equipment that is locally purchased.

i. Procurement of unprogrammed requirements in support of Special Operations Forces under AR 700–9.

Impact on New Manning System. This regulation does not contain information that affects the New Manning System.

Internal control systems. This regulation is subject to the requirements of AR 11–2. It contains internal control provisions and a checklist for conducting internal control reviews.

Supplementation. This regulation may be supplemented at the major Army command level, if required. One copy of each supplement will be furnished to HQDA(DALO-SMP-P), WASH DC 20310-0546.

Interim changes. Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

Suggested improvements. The proponent agency of this regulation is the Office of the Deputy Chief of Staff for Logistics. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA(DALO-SMP-P), WASH DC 20310-0546.

Distribution. Distribution of this issue has been made in accordance with DA Form 12-9A requirements for 700 series publications. The number of copies distributed to a given subscriber is the number of copies requested in Block 506 of the subscriber's DA Form 12-9A. AR 700-139 distribution is B for Active Army, ARNG, and USAR.

Contents (Listed by paragraph number)

*This regulation supersedes AR 702–13, 1 February 1981.

Contents—Continued

Chapter 1
Introduction

1-1. Purpose

This regulation prescribes Department of the Army (DA) policies and assigns responsibilities for the management and execution of the Army Warranty Program. This regulation governs warranties that apply to both centrally procured and locally procured items.

a. Centrally procured materiel warranties. This regulation establishes requirements and provides guidance for the management and performance of the Army Warranty Program for centrally procured materiel. The objectives of the Army Warranty Programs, as expressed within this regulation, are to—

(1) Achieve and sustain a cost effective warranty program for Army materiel.

(2) Minimize user burden and promote user satisfaction.

(3) Control warranty execution to assure maximum use and benefit from warranties.

(4) Provide information for warranty administration, execution, and evaluation.

(5) Achieve uniformity in managing and executing warranties.

b. Locally procured materiel warranties. Locally procured materiel warranties are governed by Federal Acquisition Regulation (FAR) 46.7.

1-2. References

Required and related publications are listed in appendix A.

1-3. Explanation of abbreviations and terms

Abbreviations and special terms used in this regulation are explained in the glossary.

1-4. Internal control

This registration contains an internal control review checklist for warranty cost effectiveness and payoff assessment. This checklist is located after the last chapter of this regulation.

1-5. Exemptions

The following programs are exempt from coverage in this regulation.

a. Reliability improvement warranties are defined in AR 702-3 and are more properly considered reliability improvement incentives.

b. Manufacturing dimension and tolerance warranties when used for ammunition programs are exempt from coverage in this regulation. These warranties are, in effect, a delayed final inspection acceptance and are not executed outside of the manufacturing and load assembly environment.

c. Vehicle Safety Recall Campaign directives in compliance with section 1402, title 15, United States Code (15 USC 1402) implemented by AR 750-10 are exempt from this regulation.

Chapter 2
Responsibilities

2-1. General

Section 2403, title 10, United States Code (10 USC 2403) defines specific responsibilities of the Secretary of Defense for weapon system warranties. Army Weapon System waiver authority has been delegated to the Assistant Secretary of the Army (Research, Development, and Acquisition) by the Secretary of Defense. For the Army, the AR 10-series describes functions of the Army Staff and major Army commands (MACOMs). The AR 70-series and AR 700-series describe specific responsibilities in Army research and development, production engineering, product assurance, integrated logistics support, maintenance, and supply. Additional responsibilities for carrying out the Army Warranty Program are specified below.

2-2. Deputy Chief of Staff for Logistics (DCSLOG)

The DCSLOG has Army Staff responsibility for management of the Army Warranty Program. The DCSLOG, in the Army Staff role, will—

a. Issue policy guidance for the technical requirements of warranties on both Army acquired items and non-Army acquired items used by the Army.

b. Issue policy guidance for the management of warranty compliance to the statutory requirements of 10 USC 2403, and regulatory requirements of FAR 46.7, Defense Federal Acquisition Regulation Supplement (DFARS) 46.7, and Army acquisition instructions.

c. Issue policy guidance pertaining to warranty management as part of integrated logistics support policy for the Army in AR 700-127 and in AR 700-139 where the Army is the lead service for Joint Service programs.

d. Issue policy guidance to institute data collection and reporting used to identify warranties, determine compliance, and facilitate warranty effectiveness evaluation.

e. Issue policy guidance to sustain compatibility between acquired warranties and the standard Army execution procedures. (See chap 6.)

f. Appoint an executive agent to carry out the DCSLOG responsibilities for the Army Warranty Program. (See para 2-5.)

2-3. Deputy Chief of Staff for Research, Development, and Acquisition (DCSRDA)

The DCSRDA will—

a. Issue policy guidance to assure appropriate warranty planning in materiel acquisition and management plans. (See 10 USC 2403, FAR 46.7, and DFARS 46.7.)

b. Issue policy guidance to assure that program acquisition strategy under AR 70-1 provides for warranty consideration within the acquisition plan and identifies funding for the acquisition, execution, and effectiveness evaluation of warranties.

2-4. Other Army Staff agency heads

Deputy Chief of Staff for Personnel (DCSPER), Deputy Chief of Staff for Operations and Plans (DCSOPS), Assistant Chief of Staff for Intelligence (ACSI), Chief of Engineers (COE), and The Surgeon General (TSG) will implement the Army Warranty Program in their respective areas.

2-5. Executive agent

The Commanding General, U.S. Army Materiel Command (CG, AMC) will appoint the executive agent for the DCSLOG. The executive agent will—

a. Institute policy, determine compliance, and operate data collection and reporting methods in consonance with Headquarters, Department of the Army (HQDA) objectives.

b. Sustain compatibility of warranty execution methods with the standard Army supply and maintenance logistic support systems. (See para 4-10.)

c. Provide a weapon system warranty clause exchange service for materiel developers (MAT DEVs). (See para 5-3.)

d. Direct and control the central collection activity (CCA). (See para 5-2.)

e. Report annually to the DCSLOG on the Army Warranty Program and the effectiveness of the executive agency.

2-6. Materiel developers

The MAT DEV acquiring an item will determine applicability of 10 USC 2403 and FAR/DFARS regulatory requirements. The MAT DEV will—

a. Establish and maintain a command activity for managing warranted materiel.

b. Issue necessary supplemental policy and procedures that apply to the procurement of materiel warranties.

c. Identify the cost of the warranty.

d. Determine if the warranty is cost-effective (para 4-3) and apply the criteria of the 10 USC 2403, DFARS 46.7, and FAR 46.7 requirements as applicable. (See chap 3.)

e. Manage, monitor, and evaluate the effectiveness of procured warranties using approved supplements to this regulation (when required).

f. Perform annual, inprocess and postwarranty assessments to determine effectiveness and final payoff analyses of acquired warranties. (See para 4-4.)

g. Develop, in coordination with the U.S. Army Training and Doctrine Command (TRADOC), methods of executing warranties within the Integrated Logistic Support Plan (ILSP). Define duties of the gaining MACOMS for warranty execution in the Materiel Fielding Plan (MFP).

h. Sustain compatability with the standard warranty execution procedures when gaining MACOMs perform the execution. (See chap 6.)

i. Coordinate with the gaining MACOM (or storage activity when applicable) for nonstandard execution procedures. (See para 6-2 b.)

j. Establish a warranty information data base for use by MAT DEV, gaining MACOM, Logistic Assistance Offices/logistic assistance representatives (LAO/LAR), and other Army activities. (See chap 5.)

k. Provide electronic mailbox (24-hour response) access to the central warranty information data base. (See para 5–2.)

l. Establish telephonic access (24-hour HOTLINE) for resolution of execution problems or specific warranty questions from gaining MACOMs.

m. Provide warranty execution training as an integral part of materiel fielding/new equipment training with emphasis on geographic differences and unique organizational structures.

n. Assure warranty information, procedures, and other pertinent data is included in applicable technical bulletins/manuals and field technical documents.

o Recoup from contracts (adjustments or reimbursed monies) for repair or replacements of warrantied items performed by Government activities, when Government repair or replacement is made in place of contractor repair.

2–7. Heads of gaining MACOMs

These officials will—

a. Assure that a warranty claim action (WCA) is filed for each failure of an item covered by a warranty.

b. Establish nonstandard execution procedures (para 6–2b) in coordination with MAT DEV when nonstandard procedures are acceptable to the gaining MACOM for their maintenance augmentation capability.

c Provide suggestions or advice on the scope and methods of warranty execution as requested by the MAT DEV.

d Recommend corrective action to the MAT DEV when published execution procedures prove unsatisfactory or result in extensive administrative burden.

e. Establish warranty acquisition, administration, and execution procedures for locally acquired items in compliance with FAR 46.7.

f Include warranty functions within annual gaining MACOM budget submissions to provide for the administration and repair of warranted items.

g Establish a warranty control office/officer (WARCO) at the MACOM level. MACOM WARCOs will—

(1) Review and coordinate with MAT DEV warranty execution procedures within MFPs, warranty technical bulletins (WTBs), and related warranty data to assure effective execution of warranties.

(2) Develop local written instructions for warranty execution and management within the MACOM.

(3) Direct the subordinate servicing WARCO function at the Directorate of Logistics (DOL) level for installation management organizations; at the intermediate—general support (INT-GS) for military organizations; at the State Maintenance Office level within the ARNG; and, at Army Reserve Commands for the USAR. Servicing WARCOs will—

(a) Execute warranties according to published procedures.

(b) Coordinate all warranty actions between its activities and commercial service sources (local dealer or manufacturer) and/or the MAT DEV as specified in WTBs. Such coordination does not include resolution of contractual issues.

(c) Maintain files and records as required to manage locally procured item warranties.

(4) Establish a coordinating subordinate WARCO function at MACOM determined levels such as corps, division, materiel management center, and area maintenance support activity when appropriate.

2–8. Representatives of the Logistic Assistance Program

LARs will provide advice and assistance to gaining MACOM WARCOs as part of its service interface under AR 700–4 between MAT DEV and gaining MACOMs. Representatives of the Logistic Assistance Program will—

a Clarify warranty applications/exclusions and warranty claim/report procedures upon WARCO or user request.

b Assist WARCOs in developing local procedures for warranty administration.

c Provide warranty information to users/WARCOs as a secondary source of information.

d. Provide specific assistance outlined in MFPs, technical and supply bulletins/manuals, and related documents for warranty management.

Chapter 3
Statutory and Regulatory Requirements

3–1. General

This chapter contains Army warranty policy concerning the United States code statute, FAR, and program documentation.

3–2. Weapon system warranties

a Warranties will be acquired or waivers requested for items considered as weapon systems in accordance with 10 USC 2403 and the regulatory requirement of DFARS 46.7. Waiver authority is specified by DFARS 46.770-9.

b Warranties for foreign military sales (FMS) are not required but may be elected by the FMS customer and may require special administration. (See DFARS 46.770-7.)

3–3. Nonweapon system warranties

a. Warranties will be acquired for items that are not covered by the 10 USC 2403 weapon system definition only when such warranties are cost-effective. These warranties will be acquired in accordance with the regulatory requirements of FAR 46.7 and DFARS 46.7 using the candidate selection criteria in this regulation. (See para 4–7.)

b. Commercial or trade practice warranties for centrally procured items will be acquired in accordance with FAR 46.7 when one of the following apply:

(1) They are cost-effective and can be executed by the standard execution procedures.

(2) They are cost-effective and can be executed by nonstandard execution procedures.

(3) The warranty cost cannot be severed by the MAT DEV from the item price to effect a price reduction for the item.

3–4. Warranties on locally procured items

Items that are locally procured will include warranties in accordance with FAR 46.7 only when they are cost-effective and executable by the item user. Administration and execution is the joint responsibility of the procuring activity and the item user. They must be jointly determined by local procedures prior to acquisition.

3–5. Warranties of technical data

DFARS 46.708 requires obtaining warranties for technical data whenever practicable and cost-effective. Computer software and computer software documentation are considered technical data under DFARS 52.227-7013, Rights in Technical Data.

3–6. Program management documentation

Program management documentation used for the Army System Acquisition Review Council (ASARC), inprocess review (IPR), or other decision authority reviews will include warranty consideration and plans as an integral of both the acquisition strategy and the integrated logistic support process of AR 1000–1.

Chapter 4
Warranty Acquisition Policy and Procedures

Section I
Policy and Concepts

4–1. Policy

The Army's policy for procuring warranties requires compliance with statutory and regulatory requirements. (See chap 3.) Cost-effectiveness and tailoring comprehensive coverage to fit the intended conditions and geographic locations of storage and use must be considered prior to contract award. Minimal tasks of execution to burden the operator, unit, or intermediate direct support maintenance organization is a major consideration in the tailoring of all warranties.

4–2. Concepts

Tailoring the warranty concept to fit the item and its intended use in a comprehensive manner with minimal impact on standard Army logistical procedures is the

single most important aspect of the warranty acquisition process. Warranty tailoring is intended to protect the Army from the costs and frequency of systemic failures, enact responsive remedies for failures of significant operational impact, minimize or eliminate warranty execution tasks at the gaining MACOM, and become one of the methods used to require the contractor to fulfill the obligation of providing quality Army items. Two basic warranty concepts are frequently used; expected failures and failure-free.

a. Expected failure concept. The expected failure concept is based on the knowledge that the Army procures materiel to the minimum needs of the Army; therefore any design will include expected failures. A contract supplier should not be liable for those failures that are expected, but should be held liable for failures that exceed those that are expected. In order to use the expected failure concept, the Army and the supplier must have confidence in the reliability factors or specification data that yield a given quantity of failures that may occur during the warranty term

(1) Items that utilize contractor depot or interim contract support for organic maintenance are readily adaptable to this concept since this occurs within the common contract.

(2) Items that are repaired at Army depots are also adaptable to this concept. However, the Army will incur additional cost for administration and the possibility of denied or disputed claims may increase.

(3) The use of this concept for INT–GS items requires the gaining MACOM to file a warranty claim for each failure. The MAT DEV will collect the claims. When the quantity threshold is reached, a contract remedy is then invoked for the excessive claims.

(4) The Army benefits from this warranty concept in several ways. The initial contract warranty is provided with little or no cost since the Army requires remedies only for excessive failures. When in operation, failure quantities which in sum are below the remedy threshold are an increase in product reliability and represent a cost avoidance. Likewise, total failure quantities in excess of the threshold are subject to the contract warranty remedy.

b. Failure-free concept. The failure-free concept requires a period of failure-free usage. Commercial and trade practice warranties are examples of this concept. Under this concept, each claim is subject to the contract remedy during the warranty term. Since failures may occur, the cost of the warranty will normally include the expense of repair or replacement that can be expected during the warranty term. This cost may be included in the item price and not identifiable as a separate cost.

(1) The Army's usage of failure-free warranties may occur when an item's reliability is unknown or unspecified, such as for a nondevelopment item. The use of the failure-free concept for items subordinate to the system level (para 4–7) may also be appropriate since they may not have individual indicators/recorders of usage such as an hour meter or odometer.

(2) Use of this concept must consider the cost of Army claim administration associated with the processing of each claim. This concept is often used in conjunction with the individual claim coverage (para 4–8a) of INT–GS and depot reparables/recoverables using the standard execution procedures. (See para 6–2a.)

(3) Use of this concept for items that have no INT–GS tasks (such as small arms weapons) is possible when used in conjunction with the systemic defect coverage (para 4–8b) as the method of contract remedy.

Section II
Warranty Cost-Effectiveness and Assessments

4–3. Warranty cost-effectiveness

MAT DEVs will institute procedures to determine the cost-effectiveness (AR 11–18 and AR 11–28) of warranties. Weapon system warranties require formal cost-effectiveness analysis. Nonweapon system warranty cost-effectiveness may be by either formal analysis or by documentation of rationale within the contract files.

a. Prior to negotiated procurement of an item warranty, a cost-effectiveness analysis is required to determine the value of the potential benefits received in comparison to the contract cost of the warranty plus the Army's cost of administration and execution.

b. Following receipt of formally advertized procurement bids, a cost-effectiveness analysis of the warranty is required to determine the value of the benefits in comparison to the contract cost (if separately priced) and the Army's cost of administration and execution.

c. Commercial or trade practice warranties for locally procured items require documentation of cost-effectiveness rationale within the contract files.

d. Commercial or trade practice warranties for centrally procured items require the cost-effectiveness analysis even when the warranty price is not severable from the item price.

(1) This analysis is used to determine the value of the benefits (such as reduced maintenance or materiel cost) in comparison to the Army's cost of administration and execution plus any readiness-related cost. Additional float quantities purchased to effect a factory repair cycle time, response time cost, (in terms of equipment down-time), or other productive time lost attributable to the exercise of the warranty are readiness-related costs.

(2) The cost-effectiveness analysis of a warranty, that is not severable from the item price, has a relation to storage, operation, and support costs and has three warranty execution possibilities. Execution of the warranty is implemented for the total remedies available, a selected group or level of remedies, or the execution of the warranty is not implemented because it is not cost-effective.

e. An internal control review checklist for cost-effectiveness determination is required for each contract warranty.

4–4. Warranty assessments

Assessments will be performed by MAT DEVs for warranties on an inprocess and final payoff basis.

a. Inprocess warranty assessments will be initiated concurrent with operation of the first item delivered under the contract Subsequent inprocess assessments will be performed annually until all item warranties have expired and all claims settled and a final payoff assessment is compiled.

b. The assessments will, as a minimum, contain the identification of the contract and contractor, a summary of claim activity during the period, and cumulative claim activity for the contract. Claim activity will include the claims submitted, honored, disputed, and denied and the value of each category. Denied claims will include reasons for denials such as false-pull (not deficient), abuse, or not covered by warranty Denied and disputed claims will include a failure cause if applicable In addition, an analysis will be performed to identify a proportional amount of the warranty cost to the value of warranty services/remedies received A remarks section will include tasks or services that are considered desirable or undesirable based upon the claim frequency, failure mode, and value

c. The final payoff assessment will evaluate the economic benefits derived from the warranty in comparison to the cost of corrective actions if there were no warranty Cost avoidance as well as Government cost to administer the warranty must be considered. Nonmonetary benefits will be summarized and the inprocess assessments will be consolidated and summarized

d The warranty assessments will be used to determine warranty provisions and tasks for follow-on procurements for the item (and similar items) and the overall effectiveness of the item warranty

e. An internal control review checklist for final payoff assessment determination is required for each contract warranty.

Section III
Reimbursements and Copayments

4–5. Army repair and reimbursement

Weapon system warranties will include a remedy that authorizes warranty repairs by the Army (or by Army contract) for which reimbursement will be made by the contractor. The reimbursement remedy is also required for nonweapon system warranties

a. Contract recovery of expenses for materiel (parts), labor, and transportation incurred by the Army for repair or replacement of warranty items will be accomplished by contract refunds. Transportation expense recovery is necessary only

when a warranty item's destination transportation cost exceeds the Army's normal repair facility destination cost for the item.

b. Contract recovery of gaining MACOM labor expenses (when part of the warranty coverage) will include labor expended for removal and replacement of items as well as the labor expended in the actual item repair. Labor rates used for contract computation will represent average Army maintenance labor costs for organic labor or the contractors burdened flat rate manual for labor. Maintenance allocation chart (MAC) labor hour standards will be used for computation. Summation of discrete labor hour tasks may be necessary to encompass the total repair effort.

c. Recovery of depot labor expenses will be limited to the labor expended in the item repair using the MAC or contractor labor hour standards. Labor rates used for contract computation will represent average Army depot labor rates.

d. Contract-recovered expenses will be refunded to a central DA fund for Operations and Maintenance, Army.

4–6. Copayment for prorata usage

a. Copayments for prorata usage are a payment of monies by the item owner, based on percentage of usage, to the item supplier (or representative) when a portion of warranty usage has occurred. Commercial tire and battery warranties are examples of prorata copayment warranties.

b. Copayments to contractors or dealers for prorata usage under an Army contract warranty will not be required from gaining MACOMs unless—

(1) The warranty items are covered by nonstandard warranty execution procedures negotiated as part of an MFP.

(2) The warranty items are commercial or trade practice items that are acceptable to the gaining MACOMs.

Section IV
Candidate Criteria and Warranty Coverage

4–7. Warranty candidates

Warranty candidates will be identified in accordance with the following criteria when the system or system subordinate items are the materiel to be procured:

a. Weapon systems of 10 USC 2403.

(1) Major systems identified in section 139*a*, title 10, United States Code (10 USC 139*a*).

(2) Systems not identified in 10 USC 139*a* but falling within the 10 USC 2403 definition.

(3) Items subordinate to the weapon system level that are—

(a) Within the cost criteria of DFARS 46.7.

(b) Depot reparable or depot recoverable by the maintenance and recovery codes of AR 700–82.

(c) Occur no lower than level 3 of the work breakdown structure (MIL–STD–881A; para 3.5.1) for prime mission hardware.

b. Nonweapon systems.

(1) Military and nonmilitary developed systems and system subordinate items that are listed (or proposed for listing) in Supply Bulletin 700–20, chapter 2.

(2) Are depot reparable or depot recoverable by the maintenance and recovery codes of AR 700–82.

(3) Occur no lower than the level directly below level 3 of the work breakdown structure (MIL–STD–881, para 3.5.1) for prime mission hardware.

4–8. Warranty coverage

Army warranties for centrally procured materiel will provide two coverages; individual item failure coverage and systemic defect coverage. Replacement assemblies may require both types of coverage. Commercial or trade practice warranties may be structured for both types of coverage. Pass-through warranties will be restricted in their usage.

a. Individual item failure coverage requiring individual warranty claim actions apply to MAC functions of maintenance or repair parts and special tool list (RPSTL) coded recovery functions that occur no lower than the INT–GS level for items and their subsidiary parts. Tasks for maintenance and recovery functions must be identified to the MAC or RPSTL for inclusion in the warranty but all of the identified functions may not be cost-effective for individual claim processing. The value of the function, as estimated by MAC labor hours, depot labor rates, and Army Master Data File (AMDF) part costs, must exceed the Army's cost of claim processing to be cost-effective as an individual warranty claim. When claim processing costs exceed the estimated value of the function, systemic defect coverage will be used instead of individual claim coverage.

b. Systemic defect coverage provides protection to the lowest level of impact or expense and requires a contract remedy that may cover all contract deliverables.

(1) When the contract warranty provisions include both individual item claims and systemic considerations, abnormal volume of WCAs against the particular part will initiate systemic contract remedies.

(2) When the warranty provisions do not include individual item claims, systemic failures will become evident by a significant number of product deficiency or other field reports. These include Quality Deficiency Reports, Equipment Improvement Recommendations, Report of Decrepancies, and other reports of product problems with the item.

(3) The MAT DEV, using the contract remedies, will arrange with the warranty contractor for an inventory-wide or total asset remedy when applicable. Replacements, recalls, or repairs will be coordinated with the gaining MACOM or depot as applicable. A comparable contract cost reduction may be appropriate in place of asset repair or replacement.

(4) An indepth analysis of the failure cause and a potential redesign may be necessary to prevent recurring failures.

(5) The term of coverage begins with the first contract item delivered and ends following the warranty expiration date of the last item delivered and includes all failures during the term.

c. System subordinate item contracts (para 4–7) for replacement assemblies or for assemblies integrated into systems as Government furnished equipment (GFE) may require both the systemic defect coverage and individual item failure coverage. This coverage is required for replacement items that received similar coverage under a system level warranty.

d. Commercial or trade practice warranties that extend coverage below the INT–GS level will be structured for individual item failure remedies for the INT-GS and depot level functions of maintenance and recovery and for systemic failure remedies at levels below INT–GS, when possible.

e. Pass-through warranties, which require the Army to seek remedies through vendors not directly under contract, will not be used on weapon system warranties. Commercial or trade practice warranties which have traditional subordinate pass-through warranties such as tires and batteries may be used.

4–9. Warranty duration

Warranty duration will be of sufficient time to provide a period for user operation that is proportional to the expected life of the item. The duration period is composed of two factors; average elapsed time prior to operation and operational use.

a. The average elapsed time factor is the period of time which occurs from the time of contract delivery (as evidenced by contract documented acceptance) until the item is placed into operation and includes all delays that may be normally expected prior to operational use. Included are transportation and storage delays, fielding in oversea geographic location delays, and delays planned when Government-furnished materiel is integrated into a higher weapon system.

b. The operational use factor is the period of time in actual operation that will prove the substantive quality of the item and the integrity of the manufacturing process. This period should be between 10 and 25 percent of the expected life and generally not less than 1 calendar year or 1 year of an equivalent usage rate in whatever units are best measured (for example, months, years, hours, miles, rounds).

c. When a warranty duration is computed for inclusion into a contract, the operational use factor is added to the average elapsed time factor to yield a single length duration which will be used for each delivered item.

(1) The duration period will start on the date of acceptance and each item will be identified with its unique expiration date.

(2) Items scheduled for long-term storage such as War Reserves or prepositioned stocks have the same duration as other items acquired for immediate operation. The average elapsed time factor will include the impact of long-term storage items and will result in either a longer duration period for all items under contract, or a comparable reduction in contract price for those items which have little likelihood of operational usage.

Section V
Compatibility and Identification

4–10. Warranty compatibility with standard Army support systems

Acquired warranties will sustain compatibility with the standard Army support systems. The item's support for the period under warranty will not differ from the follow-on support upon warranty expiration.

a. Storage and exercise of warranted items will not differ during the warranty from the item's postwarranty requirements.

b. Part support will operate within the Army's supply system for replacement parts. Urgent part support using direct shipment to Army maintenance facilities may be used for warranty items in the same manner that expedited shipment of nonwarranty items are used to fill urgent requisitions.

c. Warranty exhibits will be returned or disposed using the Army's disposal and retrograde return system. Specific items with return requirements or exhibit hold periods will be identified in the item's WTB and MFP.

d. WCAs will provide information to the MAT DEV and the warranty contractor in accordance with The Army Maintenance Management System (TAMMS), DA Pam 738–750 (nonaviation) and DA Pam 738–751 (aviation), TAMMS–A. Contract unique forms or information requirements will not be required when the gaining MACOM is expected to perform the standard Army execution procedures. (See para 6–2.)

e. Maintenance functions or work time figures of an item's MAC will not be changed to accommodate the warranty. The alignment of warranty coverage to maintenance levels and functions is to sustain normal support operations during the warranty period with the support that will follow warranty expiration. During the course of normal support operations, it may become necessary to move, subdivide, or combine MAC functions to accommodate the Army's support needs. The MAT DEV will attempt to realign the warranty with the MAC changes if cost-effectiveness and execution can be sustained. If contract changes cannot be accomplished, some functions may be unilaterally excluded from execution for not complying with the changed MAC.

f. Warranty remedies should not be any less responsive than normal Army maintenance methods to sustain readiness. Contract warranty provisions will be defined for responsiveness in terms of time (hours, days, weeks) between notification and resolution of a warranty claim.

4–11. Identification of warranty items

The Army's standard execution procedures (para 6–2) are based on a free flow return of failed items to the claiming level of maintenance. The passiveness of the procedures require obvious markings to allow for identification screening at the claiming levels. Therefore, warranty identification/data plates and package marking is a contract requirement and will be added to Army documentation as a requirement. In some instances, an item may be excluded from individual claim coverage and may be included under systemic claim coverage because physical size, shape, or material makes identification markings impossible. In other instances, logbook or historical record data may be used for identification purposes for items of a system level warranty.

a. Warranty information/data plates, as specified in contracts and Army documentation, will be applied to the system hardware and to depot and INT–GS reparable/recoverables that comprise the system covered by the warranty. The data plate marking requirement will comply with MIL–STD–130 and the following requirements:

(1) Minimum information markings will include "WARRANTY ITEM," "WTB XXXXX" (unique number), and "EXPIRES XX/XX" (unique date/rate). The "EXPIRES XX/XX" will be expressed as numeric month slash numeric year or usage rate (for example, hours, miles). Characters will be either white or black to obtain maximum contrast to the background. Bar coding of the warranty data and the national stock number (NSN), contract number, and contractor Federal Supply Code of Manufacturers (FSCM) number is desired but not mandatory.

(2) Background marking requirements will provide alternating blue and neutral (natural color of material) 45 degree diagonal stripes of equal width. The width of each stripe will be approximately equal to the character height. Blue color will approximate FED–STD–595, color number 35250.

b. Warranty package/packaging markings will comply with MIL–STD–129 for size and information marked. In addition, background markings as specified above for data plates will be applied to packages/packaging.

c. Expiration date/usage marked on plates and packages will be applied at contract acceptance for each item and will be that period defined as the warranty duration period (para 4–9) or usage rate equivalent.

d. Shipping and release documents will identify warranty items in the appropriate form area or remarks section to inform the receiver of the existence of warranty material. This applies to items being issued for use and items being evacuated for repair.

e. Computer programs that appear on a visual display will include a notice of warranty coverage on one of the introductory screens of the program. The warranty coverage details will be presented within the program.

4–12. Warranty technical bulletins

Warranty provisions for execution will be published in a WTB prepared in accordance with MIL–M–63034 (TM) in sufficient time to provide draft copies for MFP coordination and final copies concurrent with materiel fielding. WTBs may, by necessity, be a contract deliverable item in order to be available for MFP coordination. When WTBs are contract prepared, they will be procured by a contract line item number (CLIN) and exhibit.

Chapter 5
Warranty Information

5–1. General

Warranty information will be collected and shared by MAT DEVs and gaining MACOM organizations to document and improve warranties and their benefits using a CCA as the combined data base

a. MAT DEVs will collect and provide to the CCA, information on each warranty for centrally procured items This information will include—

(1) NSN, nomenclature, and model numbers.

(2) Contract number, contractor name, and FSCM.

(3) Warranty publication (for example, WTB) number and date.

(4) Serial, lot, or registration number range (when applicable)

(5) Warranty duration (time in months)

(6) Warranty usage limits (hrs/miles/km).

(7) Start date of first item warranty period.

(8) End date of last item warranty expiration

(9) Contract cost of warranty (sum and per unit) and contract item cost.

(10) Subordinate (pass-through) warranties if applicable.

(11) Special warranty provisions or conditions.

b. MAT DEVs will collect, collate, and automate WCAs submitted from all sources and provide information access to the CCA and annual reports to gaining MACOMs.

(1) Data or information expected to be gathered from gaining MACOMs or activities will be limited to WCA data of DA Pam 738–750 and DA Pam 738–751.

(2) Data or information gathered as part of nonstandard execution procedures will, as a minimum, provide the same data elements gathered by TAMMS/TAMMS–A WCAs. Special data collection programs such as sampling data by AR 750–37 and interim contractor support program (ICS)

data are examples of special information sources.

(3) Contract status reports (DI-A-1025) provide an alternate or corroborate means of acquiring and verifying claim data

(4) Data or information gathered within systems integration programs or depot operations as warranty claims will, as a minimum, provide the same data elements gathered by TAMMS/TAMMS-A WCAs.

5-2. Central collection activity

The executive agent directed CCA serves as a central source of automated warranty information. The CCA serves to—

a. Collect information gathered by the MAT DEV and operate a combined data base.

b. Publish listings/reports for warranty information users (MAT DEVs, WARCOs, LAOs).

(1) WARCO addresses and an index of warranty items published in DA Pam 738-750 and DA Pam 738-751

(2) Warranty Highlighter (information letter) published periodically

(3) Annual summary reports of MACOM and WARCO activity for annual compliance analysis.

c. Provide access to the data base as an electronic mailbox for queries of individual warranty coverage specifics within 24 hours from receipt of request.

5-3. Warranty clause exchange

A weapon system warranty clause exchange service will be provided by the legal office of the executive agent for MAT DEV This service will supply copies of existing warranty clauses upon request and does not supplant legal or procurement review requirements of the MAT DEV The purpose of the service is to proliferate successful clauses used for procurement of weapon system warranties under 10 USC 2403

Chapter 6
Warranty Fielding and Execution

6-1. Fielding of warranty items

Warranty items will be fielded in accordance with appropriate materiel release, fielding or transfer documents noting specific warranty requirements in the MFP.

a. Survey of local service sources.

(1) Concurrent with MFP negotiation, the materiel fielder will conduct a survey of capacity and capability of local service sources where utilization of these sources is planned.

(2) Concurrent with fielding, the gaining MACOM WARCO will resurvey the service sources to confirm servicing capability and capacity.

b. WTBs will be provided with the MFP and each item when required. In addition, WTBs will be distributed by pinpoint publication distribution methods.

c. The materiel fielding team (MFT) will provide WTB copies to the gaining MACOM and coordinating/servicing WARCOs, to the MACOM LAO, and to local LAO/LAR.

d. WTB details of coverage and execution will be explained by the MFT to WARCOs, LAOs, and LARs.

e. Gaining MACOM budget programming to accomplish maintenance, supply, and retrograde recovery tasks associated with warranty execution must encompass the potential of Army repair and contract recovery of expenses.

6-2. Warranty execution

a. Standard Army execution procedures (SAEPs). SAEPs fulfill the requirements of minimum burden, compatibility with the normal Army logistical support system, and uniformity/simplicity of administration. The basic premise of these procedures is to support the item during the warranty in the same manner as that which occurs in postwarranty ownership

(1) TAMMS/TAMMS-A procedures contain instructions and forms for completing WCAs. Contract unique forms or procedures are not used for WCAs.

(2) Individual WCAs do not occur below the INT-GS level.

(3) Supply support and retrograde recovery flow through the normal Army logistical systems.

(4) Storage and exercise requirements for warranty items do not differ from the Army's postwarranty requirements.

b. Nonstandard execution procedures. Nonstandard execution procedures are not used when execution is to be performed by gaining MACOMs except when—

(1) The MACOM agrees to perform nonstandard execution for maintenance augmentation as part of the MFP

(2) The methods of collection in AR 750-37 are utilized and no unique burden is applied to the gaining MACOM.

(3) Interim contractor support agreements provide for the WCAs and execution.

(4) Warranties do not extend beyond the wholesale level and are executed by the MAT DEV or depot system

(5) Warranties are included as part of a local procurement.

c. Warranty exhibits. Warranty exhibits (as specified in the WTB) utilize the standard retrograde return system when execution is performed by gaining MACOMs.

(1) Preservation and safeguarding of warranty exhibits are a priority task of the gaining MACOM to protect the contract remedies of the Army.

(2) Evacuation of warranty exhibits conform to the MFP and WTB instructions. Storage of exhibits is provided by the gaining MACOM pending disposition instructions from the MAT DEV.

(3) Disposition instructions are furnished (by the MAT DEV) to the gaining MACOM within 30 calendar days of the MAT DEV notification of WCA receipt.

Chapter 7
Compliance

7-1. Materiel developer

MAT DEV compliance will be accomplished by—

a. Inspector general review of compliance to the statutory requirements.

b. Executive agent review of the annual inprocess and postwarranty assessments, command visits such as the command logistics review team (CLRT) reports, and compliance visits.

c. Internal control provisions of warranty checklists.

7-2. Gaining MACOMs

Gaining MACOM compliance will be accomplished by—

a. Inspector general review of compliance to this regulation and MACOM supplementation when applicable.

b. Executive agent review of claim summaries, command visits such as the CLRT reports, and compliance visits.

7-3. Logistic Assistance Offices

LAO/LAR compliance will be accomplished by executive agent (command LAO) annual review of data repository and procedures review for each LAO support office.

7-4. Executive agent

Executive agent compliance will be accomplished by the DCSLOG, using the annual reports of the executive agency.

INTERNAL CONTROL REVIEW CHECKLIST[1]

TASK:	Army Warranty Program	ORGANIZATION:
SUBTASK:	Warranty Cost and Benefits	ACTION OFFICER:
THIS CHECKLIST:	Cost-Effectiveness Analysis and Payoff Assessment	REVIEWER:
EVENT CYCLE 1:	Warranty Cost-Effectiveness (C-E)	DATE COMPLETED:

STEP #1: Submit warranty C-E analysis summary to MACOM HQ for approval.

RISK: Contract warranty will be procured without appropriate MACOM HQ approval of C-E analysis.

CONTROL OBJECTIVE: Assure that each MACOM review the warranty C-E analysis and that the analysis receives MACOM approval.

CONTROL TECHNIQUE: Establish written procedures for coordination of all warranty C-E analyses.

TEST QUESTION	RESPONSE YES	NO	NA	REMARKS[1]
Are all warranty cost-effectiveness analyses submitted through proper channels to MACOM HQ for approval?				

STEP #2: C-E analyses are conducted in conformance with approved policies and procedures.

RISK:
C-E analyses will not be conducted with approved policies and procedures.

CONTROL OBJECTIVE: Assure that policies and procedures are established for the conduct of C-E analyses.

CONTROL TECHNIQUE: Establish current, written policies and procedures for conducting C-E analyses.

TEST QUESTION	RESPONSE YES	NO	NA	REMARKS[1]
Have current policies and procedures for conducting C-E analyses been written and disseminated?				

STEP #3: Disseminate the most current, approved C-E analysis model as a source and reference document.

RISK:
MACOM approved C-E analysis model is not readily available for use by subordinate contracting activities as a method of C-E analysis preparation.

CONTROL OBJECTIVE: Assure that the C-E analysis model is published and used.

CONTROL TECHNIQUE: Publish and update the C-E analysis model as the method for analysis of warranty C-E.

TEST QUESTION	RESPONSE YES	NO	NA	REMARKS[1]
Has the C-E analysis model been published, updated, and disseminated to contract activities of the MACOM?				

STEP #1: Document contract file with C-E analysis and rationale for warranty decision.

RISK:
Contract warranties will be procured without appropriate documentation of the contract files.

CONTROL OBJECTIVE: Assure that each contract be documented with C-E analysis and rationale for warranty decision.

CONTROL TECHNIQUE: Establish written procedures for inclusion of C-E analysis and rationale for warranty decision within contract files.

TEST QUESTION	RESPONSE YES	NO	NA	REMARKS[1]
Have contract files been documented with the C-E analysis and warranty decision?				

STEP #2: Document contract file with payoff assessment of each warranty prior to contract close-out.

RISK:
Contracts will be closed out without an assessment of the final warranty benefits.

CONTROL OBJECTIVE: Assure that each contract be documented with an assessment of the final warranty benefits.

CONTROL TECHNIQUE: Establish written procedures for inclusion of a warranty payoff assessment for each contract warranty prior to contract close-out.

TEST QUESTION	RESPONSE YES	NO	NA	REMARKS[1]
Have the contract files been documented with the warranty payoff assessment prior to contract close-out?				

[1] Provide reference to documentation or explanation for response.

The above-listed internal controls provide reasonable assurance that Army resources are adequately safeguarded. I am satisfied that if the above listed controls are fully operational, the internal controls for this subtask throughout the Army are adequate.

_____

Signed by: James B. Emahiser
Functional Proponent

I have reviewed this subtask within my organization and have supplemented the prescribed internal control review checklist when warranted by unique environmental circumstances. The controls prescribed in this checklist, as amended, are in place and operational for my organization (except for the weaknesses described in the attached plan, which includes schedules for correcting the weaknesses).

_____

Operating manager (signature)

This checklist must be used within 180 days of initial publication and every 2 years thereafter. See AR 11-2 for specific requirements of the Internal Control Program.

Appendix A References

Section I Required Publications

DA Pam 738–750
The Army Maintenance Management System (TAMMS). (Cited in paras 4–10*d*, 5–1*b*, 5–2*b*, and 6–2*a*.)

DA Pam 738–751
The Army Maintenance Management System—Aviation (TAMMS–A). (Cited in paras 4–10*d*, 5–1*b*, 5–2*b*, and 6–2*a*.)

DFARS 46.7
Defense Federal Acquisition Regulation Supplement, Warranties. (Cited in paras 2–2*b*, 2–3*a*, 2–6*d*, 3–2*a*, 3–3*a*, and 4–7*a*.)

DFARS 46.708
Defense Federal Acquisition Regulation Supplement, Warranties of Technical Data. (Cited in para 3–5.)

DFARS 46.770–7
Defense Federal Acquisition Regulation Supplement, Applicability of FMS. (Cited in para 3–2*b*.)

DFARS 46.770–9
Defense Federal Acquisition Regulation Supplement, Waiver and Notification Procedures. (Cited in para 3–2*a*.)

DFARS 52.227–7013
Defense Federal Acquisition Regulation Supplement, Rights in Technical Data. (Cited in para 3–5.)

DI–A–1025
Data Item Description for Contract Status Reports. (Cited in para 5–1*b*.)

FAR 46.7
Federal Acquisition Regulation, part 46.7. (Cited in paras 1–1*b*, 2–2*b*, 2–3*a*, 2–6*d*, 2–7*e*, 3–3*a*, 3–3*b*, and 3–4.)

FED–STD–595
Federal Standard 595, Colors. (Cited in para 4–11*a*(2).)

MIL–STD–129J
Marking for Shipment and Storage. (Cited in para 4–11*b*.)

MIL–STD–130F
Identification Marking of US Military Property. (Cited in para 4–11*a*.)

MIL–STD–881A
Work Breakdown Structures for Defense Material Items. (Cited in paras 4–7*b* and 4–7*b*.)

Supply Bulletin 700–20
Army Adopted/Other Items Selected for Authorization/List of Reportable Items. (Cited in para 4–7*b*.)

Section II Related Publications

A related publication is merely a source of additional information. The user does not have to read it to understand this regulation.

AR 11–2
Internal Control Systems

AR 11–18
The Cost Analysis Program

AR 11–28
Economic Analysis and Program Evaluation for Resource Management

AR 70–1
System Acquisition Policy and Procedures

AR 381–143
Logistic Policies and Procedures

AR 700–4
Logistic Assistance Program

AR 700–9
Policies of the Army Logistics System

AR 700–82
Joint Regulation Governing the Use and Application of Uniform Source, Maintenance and Recoverability Codes

AR 700–127
Integrated Logistic Support

AR 700–129
Joint Integrated Logistic Support

AR 702–3
Reliability Improvement Warranties

AR 750–10
Modification of Materiel and Issuing Safety-of-Use Messages and Commercial Vehicle Safety Recall Campaign Directives

AR 750–37
Sample Data Collection

AR 1000–1
Basic Policies for System Acquisition

MIL–M–63034(TM)
Manual Technical: Warranty Technical Bulletins, Preparation of

Glossary

Section I
Abbreviations

AMC
U.S. Army Materiel Command

AMDF
Army Master Data File

ASARC
Army System Acquisition Review Council

ASCI
Assistant Chief of Staff for Intelligence

ARNG
Army National Guard

CCA
central collection activity

CLIN
contract line item number

CLRT
command logistics review team

COE
Chief of Engineers

DA
Department of the Army

DCSLOG
Deputy Chief of Staff for Logistics

DCSOPS
Deputy Chief of Staff for Operations and Plans

DCSPER
Deputy Chief of Staff for Personnel

DCSRDA
Deputy Chief of Staff for Research, Development, and Acquisition

DFARS
Defense Federal Acquisition Regulation Supplement

DOL
Director of Logistics

FAR
Federal Acquisition Regulation

FMS
foreign military sales

FSCM
Federal Supply Code of Manufacturers

GFE
Government-furnished equipment

HQDA
Headquarters, Department of the Army

ILSP
Integrated Logistic Support Plan

INT-GS
intermediate—general support

IPR
Inprocess review

LAO
Logistic Assistance Office

LAR
logistic assistance representative

MAC
maintenance allocation chart

MACOM
major Army command

MAT DEV
materiel developer

MFP
materiel fielding plan

MFT
materiel fielding team

NSN
national stock number

RPSTL
repair parts and special tool list

SAEP
standard Army execution procedure

TAMMS
The Army Maintenance Management System

TAMMS-A
The Army Maintenance Management System—Aviation

TRADOC
U.S. Army Training and Doctrine Command

TSG
The Surgeon General

USAR
U.S. Army Reserve

WARCO
warranty control office/officer

WCA
warranty claim action

WTB
warranty technical bulletin

Section II
Terms

Centrally procured
Procurements made in support of materiel managed by the national inventory control point.

Cost-effective
A warranty that has tangible and intangible benefits which exceed the cost to procure, administer, and execute the warranty.

Cost-effectiveness analysis
An analysis between cost to procure, administer, and execute a warranty compared to the value of tangible and intangible benefits received.

Executable
The ability of the Army to put into operation a contract warranty and make warranty claims within the normal functions of maintenance and supply operations.

Execution
The process of carrying out the Army's right to apply for contract remedies under a warranty, such as making warranty claims.

Exhibit
A part or group of parts that are the residual materiel remaining from a warranty repair action. Broken or failed assemblies or the parts of assemblies that have failed may qualify as exhibits based on the WTB specifies.

Federal Supply Code of Manufacturers
A five-position code assigned to organizations that manufacture or maintain design control for items purchased, used, and cataloged by agencies of the Federal Government.

Gaining MACOM
The field command that receives materiel and puts the materiel into operational use.

Item
Item used in this regulation indicates procured materiel.

Materiel developer
Command or agency responsible for research, development, and production of a system in response to approved requirements.

Systemic failure
A classification for failures which occur with a frequency, pattern, or sameness to indicate a logical regularity of occurrence.

Warranty
Warranty, as used in this regulation (and FAR 46.7), means a promise or affirmation given by a contractor to the Government regarding the nature, usefulness, or condition of the supplies or services furnished under the contract.

APPENDIX D

SECRETARY OF THE NAVY INSTRUCTION 4330.17

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20350-1000

SECNAVINST 4330.17
SO-4 (CBM)
18 SEP 1987

SECNAV INSTRUCTION 4330.17

From: Secretary of the Navy

Subj: NAVY POLICY ON USE OF WARRANTIES

Ref: (a) Navy Acquisition Regulations Supplement (NARSUP) SUBPART 46.72
(b) Federal Acquisition Regulation (FAR) SUBPART 46.7
(c) DoD FAR Supplement (DFARS) SUBPART 46.7

1. Purpose. To ensure that the Department of Navy (DON) obtains and administers warranties that enhance the quality, reliability and performance of systems, subsystems and materials.

2. Scope. This instruction applies to all Fleet, Fleet Marine Force and Shore activities involved in logistics support for DON systems, subsystems and materials.

3. Policy. It is DON Policy to:

a. Ensure that Navy obtains warranties for:

(1) all weapons systems used directly by the armed forces. This applies to weapons systems which will have a unit cost greater than $100,000, or for which the eventual total procurement cost will be more than $10,000,000, unless such warranties are determined not to be cost effective.

(2) all other supplies and services (i.e., non-weapons systems), when the contracting officer determines that obtaining a warranty is advantageous to the Government. Such warranties must equal or exceed the requirements of DFARS 46.770.

b. Ensure that Systems are established for:

(1) reporting failed items under warranty

(2) user return of warranted products

(3) collecting and analyzing actual warranty use and claim data

4. Action. Addressees will implement and provide copies of implementing instructions to ASN (Shipbuilding and Logistics) Contract Business Management within 120 days. Detailed directives should address the issues presented in reference (a).

SECNAVINST 4330.17
18 SEP 1987

a. The Chief of Naval Operations will:

(1) establish procedures to ensure that warranties are obtained for:

(a) weapons systems meeting the thresholds specified here.

(b) all other supplies and services (i.e., non-weapons systems) per references (b) and (c).

(2) establish procedures to ensure maximum use of warranted products before expiration of the warranty periods.

(3) establish a customer/user notification system which provides for feedback information on failed items under warranty, minimizing reporting requirements of fleet activities and maintenance personnel.

(4) develop procedures for immediate issuance of credit to the end item user, when appropriate, when requisitioned products under warranty are found to be defective upon installation.

(5) develop a system for collecting actual warranty use and claim data, and for performing an analysis of the data on an annual basis with the first analysis to be performed on 30 June following implementation of this instruction, and annually each June thereafter. Provide copies of annual warranty data analyses to the Assistant Secretary of the Navy (Shipbuilding & Logistics) (ASN(S&L)) within 60 days of the end of each annual analysis period.

b. The Commandant of the Marine Corps will develop warranty policy for Marine Corps acquisitions, and establish procedures for processing warranty claims.

c. The Comptroller of the Navy will ensure that procedures are available to collect funds under warranties and that those funds are properly credited to the appropriate accounts.

Everett Pyatt

EVERETT PYATT
ASSISTANT SECRETARY OF THE NAVY
(SHIPBUILDING AND LOGISTICS)

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APPENDIX E

AIR FORCE REGULATION 70-11

DEPARTMENT OF THE AIR FORCE
Headquarters US Air Force
Washington DC 20330-5000

AF REGULATION 70-11

1 December 1988

Acquisition Management

WEAPON SYSTEM WARRANTIES

Weapon system warranties (WSW) provide the Air Force ways to motivate contractors to design, produce, and deliver quality weapon systems as well as a means to correct defects for which the contractor is responsible. This regulation provides policy and procedures, and assigns responsibilities for acquiring, administering, and reporting of WSWs. It is to be used in conjunction with the Federal Acquisition Regulation (FAR), Subpart 46.7, Warranties, and the Department of Defense FAR Supplement (DFARS) and the Air Force FAR Supplement (AFFARS) thereto.

This regulation applies to all Air Force activities engaged in the acquisition and administration of WSWs. This includes subsidiaries or affiliated agencies for which the US Air Force has support responsibilities, such as US Air Force Reserve (USAFR) and Air National Guard (ANG) units and members.

Section A—General Information

1. Terms Explained:

a. Action Point. The organization or individual responsible for all actions necessary to investigate a problem under the Service/Deficiency Reporting System and to determine possible courses of action to resolve it.

b. Cost-Benefit Analysis. An analytical procedure used to determine if a warranty is cost effective by analyzing both the qualitative and quantitative costs and benefits of the warranty.

c. Defect. As used in this regulation, a defect is any condition or characteristic in supplies or services furnished under a contract that does not conform to the contract provisions (Also see Department of Defense Federal Acquisition Regulation Supplement (DFARS) Subpart 46.701).

d. Design and Manufacturing Requirements. Structural and engineering plans and manufacturing particulars, including precise measurements, tolerances, materials, and finished product tests for the weapon system being produced (Also see DFARS, Subpart 46.770-1).

e. Essential Performance Requirements. Measurable, verifiable, trackable, and enforceable operating capabilities and/or maintenance and reliability characteristics of a weapon system that are determined to be necessary for the system to fulfill the military requirement for which the system is designed (Also see DFARS, Subpart 46.770-1).

f. Foreign Military Sales. That portion of United States security assistance authorized by the Foreign Assistance Act of 1961, as amended, and the Arms Export Control Act of 1976, as amended. This assistance differs from the Military Assistance Program and the International Military Education and Training Program in that the recipient provides reimbursement for defense articles and services transferred.

g. Implementing Command. The Air Force command responsible for developing and acquiring the weapon system, subsystem, or item of equipment.

h. Initial Production Quantity. The number of units of a weapon system contracted for in the first program year of full-scale production (Also see DFARS, Subpart 46.770-1). Full-scale production means that production beyond low-rate-initial-production.

i. Mature Full-Scale Production. As used in this regulation, production of a weapon system after manufacture of the lesser of the initial production quantity or one-tenth of the eventual total production quantity (Also see DFARS, Subpart 46.770-1).

j. Product Performance Agreement. A form of warranty, guarantee, or incentive used in a government contract to achieve or improve

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product performance or supportability in the operational environment.

k. Program Manager. The single Air Force manager (system program director, program or project manager, system program manager or item manager) during any specific phase of the acquisition life cycle.

l. Supporting Command. The command assigned responsibility for providing logistics support for weapon systems, subsystems, and equipment; it assumes program management and engineering responsibility from the implementing command.

m. Using Command. The command assigned responsibility for operating, employing, and deploying Air Force weapon systems, subsystems, and equipment in the conduct of training or actual combat operations.

n. Warranty. A promise or affirmation given by the contractor to the government regarding the nature, usefulness, or condition of the supplies or performance of services furnished under the contract.

o. Weapon System. As used in this regulation and consistent with DFARS, Subpart 46.770-1, a system or major subsystem used directly by the Armed Forces to carry out combat missions. By way of illustration, the term "weapon system" includes, but is not limited to the following, if intended for use in carrying out combat missions: tracked and wheeled combat vehicles; self-propelled, towed, and fixed guns, howitzers and mortars; helicopters; naval vessels; bomber, fighter, reconnaissance and electronic warfare aircraft; strategic and tactical missiles including launching systems; guided munitions; military surveillance, command, control, and communication systems; military cargo vehicles and aircraft; mines; torpedoes; fire control systems; propulsion systems; electronic warfare systems; and safety and survival systems. This term does not include related support equipment, such as ground-handling equipment, training devices and accessories thereto; or ammunition, unless an effective warranty for the weapon system would require inclusion of such items. This term does not include commercial items sold in substantial quantities to the general public as described at FAR Subpart 15.804-3(c).

p. Weapon System Warranties Manager. The office (or individual), designated by the program manager, responsible for management and administration of a specific contractual warranty.

q. Weapon System Warranties Plan. A plan containing program warranty strategy, terms of the warranty, and administration and enforcement requirements.

2. WSW Program Objectives. The objectives of the WSW Program are to:

a. Develop and acquire warranties that:

(1) Motivate the contractor to ensure product quality and performance.

(2) Continue contractor responsibility and involvement beyond the delivery date and for the entire warranty period.

(3) Are easy to manage and administer, such that there is no disruption to existing military systems and procedures.

(4) Are enforceable.

(5) Are affordable in relation to potential benefits.

b. Provide standard procedures for identifying, reporting, tracking, and correcting defects and failures covered by a contractual warranty, including performance measurement and tracking of weapon systems, equipment, and items.

c. Minimize the need for new and costly warranty data tracking systems and related manpower resources to administer contract warranties.

3. Background Information. The US Air Force has long recognized the importance of ensuring product quality in fielded weapon systems and equipment through the use of warranties, guarantees, and various performance incentive arrangements, i.e., product performance agreements (PPA). The Defense Procurement Reform Act of 1985 (Title 10, United States Code, Section 2403) reemphasized the importance of warranties by enacting permanent statutory requirements for warranting weapon systems that are entering mature full-scale production. This regulation provides the basic policies, procedures, and responsibilities to effectively implement WSW requirements.

Section B—Basic Policies and Procedures

4. Applicability and Scope:

a. General Information. The focus of this regulation is on weapon system warranties. As such, these warranties must be acquired, administered, and reported as required by this regulation and DFARS, Subpart 46.7 as supplemented, and meet the objectives stated in paragraph 2. When determined to be in the best interest of the government, the policies and procedures set forth in this regulation may be used

when acquiring nonstandard FAR or commercial warranties for other items and services.

b. Weapon Systems. All weapon systems entering into mature full-scale production with a unit weapon system cost of more than $100,000, or for which the eventual total procurement cost is in excess of $10,000,000 must be covered by a weapon system warranty in accordance with 10 U.S.C. 2403, as implemented by DFARS, Subpart 46.7 and the Air Force supplement thereto, unless a waiver is approved (paragraph 15). The prime contractor must guarantee that the weapon system provided under the production contract will:

(1) Conform to the design and manufacturing requirements specifically delineated in the production contract (or any amendment to that contract).

(2) Be free from all defects in materials and workmanship at the time it is delivered to the United States Government.

(3) Conform to the essential performance requirements of the item as specifically delineated in the production contract (or any amendment to that contract).

The three guarantees described above combine to form a WSW as required by 10 U.S.C. 2403. The first two guarantees (subparagraphs (1) and (2)) warrant the contract specification while the third guarantee (subparagraph (3)) warrants selected performance parameters. Also, program offices may require warranties that provide greater coverage and remedies than specified in this regulation, such as including EPR warranty coverage in other than a mature full-scale production contract.

c. Other Items and Services. All other items and services not meeting the weapon system definition or the cost thresholds identified in b above, may be covered by a warranty as specified in FAR Subpart 46.7 and supplements thereto. The policies and procedures in this regulation may be used.

d. Technical Data. In accordance with DFARS, Subpart 46.708 and the Air Force Supplement thereto, warranty of technical data should be obtained whenever practical and cost effective.

e. Foreign Military Sales (FMS). DFARS, Subpart 46.770-7, Applicability to FMS, provides DOD policy on acquiring WSWs for all weapon systems procured for FMS requirements.

f. Foreign Military Acquisitions. AFFARS, Subpart 46.770-92, Foreign Military Acquisitions, provides Air Force guidance on acquiring WSWs for all weapon systems procured through a foreign government for United States Government use The same guidance must be followed on acquiring WSWs from foreign sources except when the acquisition laws of the host country apply (e.g., country-to-country memorandum of agreement may require the laws of the host country from which the weapon system is being procured to apply).

5. WSW Planning:

a. The intent to use warranties must be established early in the acquisition cycle. Acquisition plans supporting Demonstration and Validation (DEM/VAL) and Full Scale Development (FSD) efforts should address the applicability of and planning for obtaining a WSW on production contracts. If feasible, a WSW should be considered for use during FSD. A sample warranty provision that places a contractor on notice that a WSW will be required on the production contract must be placed in DEM/VAL Request for Proposal (RFP). The provision at this time may be only a framework that identifies the essential performance requirements that will be warranted and the remedies to be invoked for the correction of defects. A more complete model provision that sets forth all the warranty terms and conditions must be included in the FSD RFP. Results from the DEM/VAL and FSD phases should be used to tailor warranty requirements for the production phase. When the government requires contractors to propose upon government-developed clauses at the time of FSD or later, they may also propose alternatives that the government will evaluate. Warranty strategy should be reassessed periodically. Attachment 1 shows how warranty-related activities interface with the system life cycle.

b. A determination to apply a warranty to a weapon system impacts not only the implementing command but also the supporting and using commands and responsible contract administration office. Therefore, the program office must prepare and coordinate a WSW plan with supporting and using commands, responsible contract administration office, and the program manager must approve it as required in Attachment 2 to this regulation. The WSW plan may be an attachment to other program office-generated plans. The program manager must approve the WSW plan within 6 months after award of the FSD contract, and the program manager must update it for the initial and follow-on production contracts.

c. A warranty plan is also required when a warranty is to be contractually acquired for

nonweapon systems, items, or services that will require using, supporting, and participating command support to administer and enforce the warranty. The government also requires a warranty plan for FMS and foreign military acquisitions when a WSW will be acquired.

6. Cost-Benefit Analysis (CBA). It is DOD policy to obtain only cost-effective WSWs. Therefore, a CBA must be done to determine whether the contemplated WSW, which will be in the production contract, is cost effective. A CBA must be done, even though the contractor may propose a "no-cost" WSW, to compare the government's cost of administering and enforcing the WSW to the potential benefits to be derived from the proposed WSW. DFARS, Subpart 46.770-8 contains DOD policy concerning WSW CBA and AFR 173-15, paragraph 4-7, provides Air Force guidance for conducting the CBA, as well as when the Air Force should accomplish and update the CBA. The Product Performance Agreement Center (PPAC) has also developed a computer model to help program offices in doing the WSW CBA. When accomplishing the CBA, the information contained in the Warranty Activity Report, if available, must be considered (paragraph 16d).

7. Pricing Considerations. In addition to the guidelines contained in the Armed Service Pricing Manual, the following guidelines should be followed when developing the WSW price:

a. The price of a warranty may include reasonable costs, but not profit, for the repair or replacement of a minimum number of random or predicted failures caused by manufacturing or material and workmanship defects, in the early production lots. The contractor shall be totally responsible for the repair or replacement of any failures in excess of the minimum accepted level. Costs, which may be recognized include: engineering and manufacturing labor, parts and materials, shipping and handling, etc.

b. The price of a warranty shall not include any costs for redesign efforts. The contractor, in most cases, is paid to design an item, and once the contractor signs up to the design and performance specification, should bear all costs in meeting those specifications. It would not be unreasonable, however, to allow for redesign costs, if the design was specified or developed by the government or another contractor.

c. The price of a warranty may include reasonable warranty administration and warranty data costs. Reasonable costs may include the salary of a warranty manager, information management systems to collect and report warranty data, engineering costs related to the evaluation of warranty data, etc. Maintenance agreements for repair or replacement are not warranties and should be priced separately.

d. When pricing a warranty, the rule-of-thumb approach should be avoided. Instead, a bottom-up approach, or if adequate data is available, cost-estimating relationships, or a combination of the two approaches should be used to price a warranty. Contractors shall be required to provide detailed breakdowns of their warranty price, and all proposed costs must be fully justified. Engineering assistance should be obtained in evaluating the proposed costs, especially in analyzing the predicted number of random failures, and the estimated costs to repair such failures.

e. In deriving a cost-effective warranty, the Contracting Officer may provide for certain exclusions and limitations in the terms of the WSW clause which must be considered when pricing the warranty (DFARS, Subpart 46.770-3).

8. Essential Performance Requirements (EPR):

a. The ability to affect design to achieve EPRs decreases rapidly as a weapon system moves through the research and development phases. Therefore, contractors must be alerted early in the acquisition cycle, ideally no later than the DEM/VAL phase, that the government intends to require a performance warranty under the production contract. This may be accomplished by identifying EPRs or goals in the DEM/VAL contract. It is expected that these goals or requirements will continue to be refined as the weapon system proceeds through development. EPRs must be consistent with the operational effectiveness and suitability requirements as well as pertinent performance and support parameters and goals. These requirements will be specified in statements of need (SON), depot support requirements documents (DSRD), and system operational requirements documents (SORD). For the weapon system production contract, the EPRs subject to warranty must be described in the contract specifications. EPRs must be identified in the WSW plan required by paragraph 5b.

b. An EPR should be selected based on operational performance requirements for which compliance cannot be determined with certainty prior to or during acceptance testing. Such requirements include reliability, maintainability, and availability. The contractor's

compliance with these requirements may only be determined as a result of field operations in the environment in which the weapon system is required to operate. Select those EPRs which will be measured during the normal field operation and maintenance of the weapon system, as defined in the operation and maintenance concepts, using existing field performance data collection systems.

c. Generally, system level EPRs should be selected for warranty coverage rather than EPRs that apply to lower tiers such as component or line replaceable unit (LRU). For example, if a prime contractor is providing the total weapon system, the EPRs selected for warranty coverage should be at the weapon system level rather than at the subsystem or lower level. On the other hand, the government often provides major subsystems as government furnished equipment (GFE) to the prime contractor. In this instance, the EPRs may be at the major subsystem level versus the LRU level or component level.
The GFE prime contractor would be responsible for the warranty on the GFE item.

d. In accordance with AFFARS, Subpart 46.770-4, authority for designating EPRs is delegated to commanders of major commands with power to redelegate. EPRs must be coordinated with the using and supporting commands prior to their incorporation into any contract.

9. Waivers and Deviations to Specification Requirements:

a. Prior to approval of any proposed waiver or deviation to a particular requirement set forth in the contract specification, a written evaluation of the impact of the proposed waiver or deviation on the WSW EPRs must be accomplished. In no event will a waiver or deviation be approved that releases the contractor from responsibility for complying with the WSW EPR unless a Secretarial waiver is approved in accordance with Section C. In such cases, an equitable adjustment to the contract price and other terms and conditions of the contract must be accomplished.

b. To ensure the government's approval of a waiver, deviation, or engineering change proposal request submitted under MIL-STD-480A, the WSW must require an impact statement to be submitted with the request by the contractor.

10. Remedies:

a. Each WSW must clearly describe the remedies available to the government to correct a manufacturing defect or performance failure covered under the WSW. For example, remedies for EPR breaches should provide for the immediate restoral of combat capability (through use of consignment spares), no cost ECPs (to fix the breach), and subsequent retrofit of new designs at no cost to the government. As a minimum, the WSW must provide for the remedies specified in DFARS, Subpart 46.770-2(a)(2), which are described below:

(1) Require the contractor to promptly take such corrective action as necessary (e.g., repair, replace or redesign) at no cost to the United States Government.

(2) Require the contractor to pay costs reasonably incurred by the United States in taking necessary corrective action (i.e., government repair).

(3) Equitably reduce the contract price (e.g., may be appropriate when combat capability is not affected).

b. When contractor repair or replacement is stipulated as an authorized remedy, also stipulate the required turn around time from contractor receipt of the defective or failed item to contractor shipment or government acceptance of the repaired or replacement serviceable item. Also stipulate the government remedy should the contractor fail to meet the guaranteed turnaround time, e.g., consignment spares.

c. If government repair is authorized, clearly identify the conditions, limitations and exclusions that may apply. Also indicate how the government will determine the amount of reimbursement or equitable adjustment to the contract price.

d. The WSW should clearly state whether redesign is a remedy and under what circumstances the redesign remedy would be invoked. For instance, if the defect is considered systemic, then redesign may be the most appropriate remedy. If redesign requires an engineering change proposal (ECP), then the redesign remedy should state the contractor's responsibility for retrofit.

11. Clause Development. The specific warranty clause including the identification of essential performance requirements (EPR), to be included in the contract must be consistent with the approved WSW Plan. The warranty clause must be developed by the implementing command program/system manager. Specific requirements that must be addressed in preparing the warranty clause are contained in Attachment 3.

12. WSW Administration. WSW administration requirements must be developed as an integral part of the overall warranty planning and warranty clause development process as required in paragraph 5. Administration requirements must be consistent with the planned operational and maintenance concepts of the weapon system to be fielded, and must be fully integrated with all logistics support elements as defined in AFR 800-8, and any contractor support requirements as defined in AFR 800-21. Additional field level inspections, tests, measurements, or data collection systems must not be required to administer and enforce the terms of the warranty unless these additional requirements are cost-effective, coordinated in the WSW plan, and waivers obtained as required in Attachment 4 for new data systems. The WSW must minimize the administrative burden imposed on maintenance, supply, transportation, and other personnel supporting the weapon system. Specific WSW administration requirements are shown in Attachment 4.

13. Training. Orientation and special training requirements must be established for all personnel responsible for WSW acquisition and administration as described in paragraphs 20 through 23.

14. WSW Management Improvement Group. The WSW Management Improvement Group provides a mechanism for ensuring the timely development and implementation of proposed changes and improvements to WSW policies and procedures. It also recommends the development of other management tools and products, i.e., guide books, models, etc., that contribute to more effective WSWs. This group does not replace or assume any of the responsibilities of the respective major commands or higher headquarters. Rather, this group evaluates and develops recommended changes to WSW policy and implementation tools or techniques. The WSW Management Improvement Group is chaired by SAF/AQCS. The PPAC will serve as executive secretary for the group and will schedule meetings, develop agenda items, and track action items. Other group members will include representatives from SAF/ACCE, HQ USAF/LEYM, HQ USAF/LE-RD, HQ AFSC/PLE/PKC, and HQ AFLC/MMA/PMP. Representatives from other major commands will also be invited to participate to address field concerns and recommended WSW management improvements. The group will meet on a semi-annual basis or more frequently at the call of the chairperson.

Section C—WSW Waivers, Notifications, and Reports

15. Waivers and Notifications Requirements. The policy and procedures for waiving one or more of the WSW guarantees required by 10 U.S.C. 2403, as implemented by DFARS, Subpart 46.770-2, and for notifying the Congress of the Air Force's determination to waive a WSW or not to include EPR guarantees on weapon systems that are major defense acquisition programs not yet in mature full-scale production are contained in DFARS, Subpart 46.770-9. In addition, the procedures set forth below must be followed:

a. Requests for waivers must be submitted to SAF/AQCS. When contract award would be significantly delayed by the waiver and advance notification, if required, a contract option for the warranty shall be included that can be exercised within a reasonable period of time if the waiver is not approved. If the waiver is being sought on the basis of not being cost-effective, the best price deemed obtainable shall be negotiated between the parties and included in the option.

b. The request for waiver must contain, in addition to the information required by DFARS, Subpart 46.770-9(d), the following:

(1) A copy of the cost-benefit analysis if the basis of the waiver is that a warranty would not be cost-effective.

(2) Action taken to assure product quality and achievement of EPRs in lieu of obtaining a warranty.

(3) Mandatory exercise date of the warranty option, if applicable.

c. Requests for waivers and advanced notifications pursuant to 10 U.S.C. 2403 must be provided to SAF/AQCS, 60 days prior to contract award.

16. Reporting Requirements:

a. WSW Usage Report (RCS: HAF-AQC (SA)(8701)). Each contract award for a weapon system that is covered by a WSW must be reported to SAF/AQCS by the implementing commands. Attachment 5 prescribes the warranty information to be provided. A copy must be sent to AFALC/PP, Wright-Patterson AFB, Ohio. The reports are to be submitted on a semi-annual basis for the periods 1 October to 31 March, and 1 April to 30 September within 45 days after period completion. Within 90 days after each reporting period, the AFALC/PP will provide to

SAF/AQCS a summary of the implementing command inputs, including an analysis of such items as warranty duration, exclusion and limitations, unique terms and conditions, etc.

b. Failure Analysis Reports. Contracts containing WSWs must require the contractor to provide failure analysis reports or, as a minimum, corrective action reports for all items returned under the terms of the warranty for corrective action or repair. These reports are distributed to management, engineering, logistics, test and evaluation activities which document a need for such data during the contract data requirements list (CDRL) preparation and to the contract administration office.

c. Incurred Warranty Costs Report. Contracts containing WSW must require the contractor to provide a periodic report of incurred costs as a result of the warranty, if any, to the WSW manager. This report may be in contractor's format and may be submitted as a part of other required cost reports or as a separate report.

d. Warranty Activity Report. The evolving maturity of a weapon system and an adequate performance data base may demonstrate that the continued use of a WSW on future buys is not feasible or cost-effective. Therefore, annual reports by the government or contractor that provide a summary of warranty activity must be accomplished for all contracts containing WSWs. These reports must be submitted to the government program manager. The first report must be provided 1 year from the delivery of the first warranted item under the contract. Subsequent reports must be provided until all item warranties have expired and all claims are settled. The warranty assessments should be used by the program manager to determine warranty provisions and tasks for follow-on procurements for the weapon system, and to evaluate the overall effectiveness of the WSW. It should also be used as a key data input when accomplishing the required CBA that is addressed in paragraph 6. A copy of these reports must be provided to AFALC/PP for information. The report must include as a minimum:

(1) The contractor and contract number.

(2) A summary of the claim activity during the period and cumulative claim activity. Claim activity must include the claims submitted, honored, disputed, and denied, and include the dollar value for each category. Denied claims must include reasons for denials, such as false-pull (not defective), abuse, or not covered by the warranty.

(3) A "remarks" section that identifies the warranted tasks or services that are considered desirable or undesirable based on the claim frequency, failure mode, and dollar value.

Section D—Product Performance Agreements (PPA)

17. PPAs incorporate warranties and other contractual arrangements that motivate the contractor to achieve desired performance. Various incentives may also be included in these arrangements. There are many types of PPAs besides warranties (e.g.,reliability improvement warranty, availability guarantee, logistics support cost guarantee, etc.). PPAs provide increased flexibility to tailor the WSW to the program office's needs. Their use should be considered in the EPR portions of the WSW as a means of assuring or providing incentive to exceed performance requirements. The US Air Force PPAC, located at the Air Force Acquisition Logistics Center, Wright-Patterson AFB, Ohio, is chartered to assist acquisition activities in the development and analysis of PPAs. In this regard, they have developed a PPA guide and a decision support system that are readily available. Additionally, they can provide assistance to program offices on any aspect of planning, clause selection, analysis, and administration to develop a WSW that meets program objectives.

Section E—Responsibilities

18. Air Force Secretariat:

a. SAF/AQ:

(1) Establishes Air Force policy on the development, selection, application, implementation, and reporting of warranties in compliance with the regulatory requirements of the FAR, Subpart 46.7 and supplements thereto.

(2) Monitors the WSW Program to ensure implementation is effective and consistent with Air Force and DOD direction.

(3) Reviews requests for warranty waivers and notifications, and forwards such requests to the Assistant Secretary of the Air Force for Acquisition for approval.

(4) Collects, evaluates, coordinates, and submits warranty reporting data to the Secretary of the Air Force, DOD, and the Congress as appropriate.

b. SAF/AC:

(1) Establishes Air Force policy on the selection and application of cost benefit analysis techniques for evaluating alternative warranty

strategies as required by FAR, Subpart 46.7 and supplements thereto.

(2) Monitors the WSW program to ensure cost benefit analysis application is effective and consistent with Air Force and DOD direction.

19. HQ USAF/LE:

a. Establishes Air Force policy and guidance in conjunction with SAF/AQ, for the field administration, identification, processing, control, and failure reporting of warranted items in the logistics system.

b. Monitors the WSW Program to ensure implementation is effective and consistent with Air Force and DOD direction.

20. Implementing Command (Usually Air Force System Command, Air Force Logistics Command, or Air Force Communications Command):

a. Designates a command office of primary responsibility for WSW Program policy and implementation.

b. Issues supplemental policy and implementation procedures jointly with the supporting command to fully implement the WSW Program and ensure a smooth transition of warranty management responsibilities during program management responsibility transfer (PMRT).

c. Develops training requirements and implements training programs to ensure that program managers and all responsible program personnel are fully aware of their responsibilities under the WSW Program and that warranty contract requirements are cost-effective, enforceable, and can be administered in the field.

d. Collects, evaluates, coordinates, and submits required warranty data to SAF/AQ for evaluation and further processing to SAF, DOD, and the Congress as appropriate.

e. Designates EPRs in accordance with paragraph 8.

f. Ensures that warranty costs (administration, data, transportation, etc.) are planned and programmed for each weapon system acquisition.

g. Assumes the responsibilities of paragraph 27 when designated as the responsible OT&E organization by HQ USAF Program Management Directive (PMD).

h. Ensures, in conjunction with the supporting command, that warranty contract requirements are cost effective, enforceable, and can be administered in the field.

i. Leads the warranty planning efforts with the participation of the supporting and using commands.

21. Supporting Command (Usually Air Force Logistics Command):

a. Designates a command office of primary responsibility for WSW Program policy and implementation.

b. Issues supplemental policy and implementation procedures jointly with the implementing command to fully implement the WSW Program.

c. Designates a warranty focal point to ensure a smooth transition of warranty management responsibilities during program management responsibility transfer (PMRT).

d. Develops training requirements and implements training programs to ensure that all support personnel are fully aware of their responsibilities under the WSW Program.

e. Ensures, in conjunction with the implementing command, that warranty contract requirements are cost-effective, enforceable, and can be administered in the field.

f. Participates in the warranty planning efforts led by the implementing command, and provides command coordinated EPRs with recommended approaches for administration and tracking of proposed EPR parameters.

g. Collects, evaluates, coordinates, and submits warranty reporting data as requested by the implementing command, and monitors the effectiveness of procured warranties in achieving WSW Program objectives.

h. Assumes the responsibilities of paragraph 27 when designated as the responsible operational test and evaluation (OT&E) organization by HQ USAF Program Management Directive (PMD).

22. Using Command:

a. Designates an office of primary responsibility for WSW Program policy and implementation.

b. Cooperates with the implementing, supporting, and participating commands in developing and implementing WSW Program requirements.

c. Participates in the warranty planning efforts led by the implementing command, and provides command coordinated EPRs with recommended approaches for administration and tracking of proposed EPR parameters.

d. Develops training requirements and implements training programs to ensure that all

support personnel are fully aware of their responsibilities under the WSW Program.

e. In conjunction with the implementing command, ensures that warranty contract requirements are cost-effective, enforceable, and can be administered in the field.

f. When required by a coordinated WSW plan:

(1) Collects, evaluates, coordinates, and submits warranty reporting data as requested by the implementing command, and monitors the effectiveness of procured warranties in achieving WSW Program objectives.

(2) Designates the field level warranty action point to coordinate all warranty related data collection, warranty failure reporting, and warranted item control and distribution requirements with the warranty manager.

g. Assumes the responsibilities of paragraph 27 when designated as the responsible OT&E organization by HQ USAF Program Management Directive (PMD).

23. Air Training Command:

a. Designates a command office of primary responsibility for WSW program policy and implementation.

b. Cooperates with the implementing, supporting, and participating commands in developing and implementing WSW program requirements.

c. Participates in the warranty planning efforts led by the implementing command, and provides coordinated training and training support information required to implement warranty requirements on each acquisition program.

d. Develops training and training support cost information for cost-benefit analysis, tradeoff studies, and other purposes, as necessary.

e. Coordinates with the USAF Product Performance Agreement Center to develop warranty selection, analysis, administration, and enforcement methodology in formal school curricula.

24. Air Force Systems Command (AFSC):

a. Assumes the responsibilities of paragraph 20 when designated as the implementing command.

b. Assumes the responsibilities of paragraph 21 when designated as the supporting command.

c. Develops WSW program implementation procedures in conjunction with AFLC.

d. Provides program direction and with AFLC jointly oversees the operation, staffing, and funding requirements of the USAF Product Performance Agreement Center.

e. Plans for and ensures an orderly transition of warranty management responsibilities to AFLC during program management responsibility transfer.

25. Air Force Logistics Command (AFLC):

a. Assumes the responsibilities of paragraph 20 when designated as the implementing command.

b. Assumes the responsibilities of paragraph 21 when designated as the supporting command.

c. Develops WSW program implementation procedures in conjunction with AFSC.

d. Provides program direction and with AFSC jointly oversees the operation, staffing, and funding requirements of the USAF Product Performance Agreement Center.

e. Ensures an orderly transition of warranty management responsibilities from AFSC during program management responsibility transfer.

26. Air Force Communications Command (AFCC):

a. Assumes the responsibilities of paragraph 20 when designated as the implementing command.

b. Assumes the responsibilities of paragraph 21 when designated as the supporting command.

c. Develops WSW program implementation procedures in conjunction with AFLC.

d. Plans for and ensures an orderly transition of warranty management responsibilities to AFLC during program management responsibility transfer.

27. Air Force Operational Test and Evaluation Center (AFOTEC):

a. Designates an office of primary responsibility for WSW Program policy and implementation.

b. Coordinates the OT&E plan with the implementing, supporting, using, and training commands to ensure that all warranty deficiencies discovered during OT&E are reported as required by the approved warranty plan and Attachment 4 to this regulation.

c. Reports warranty deficiencies, as required, in interim and final OT&E reports.

d. Provides when requested by the implementing command an assessment of the

testability of proposed EPRs prior to production contract award.

e. Assists the appropriate organization with the responsibilities in b through d above when such organizations are designated by program management directive (PMD) to conduct the OT&E or when OT&E is initiated and conducted by a major command.

28. USAF Product Performance Agreement Center (PPAC):

a. Develops management tools, analytical techniques, and handbooks to assist program managers in selecting, evaluating, applying, and administering warranties for weapon systems, equipment, and parts.

b. Provides technical assistance, on a consultation basis, to Air Force activities in developing, selecting, and tailoring warranties.

c. Maintains the WSW Program repository and data base to support warranty effectiveness studies and lessons learned requirements.

d. Maintains a repository or locator for warranty-related software developed by the government or at government expense to manage or administer warranties.

e. Develops generic warranty clauses for higher headquarters consideration to minimize the proliferation of unique warranty provisions that require complicated or nonstandard administrative efforts.

f. Serves as the central data repository for warranties and related business arrangements (paragraph 17).

g. Analyzes the effectiveness of existing and proposed warranties and related business arrangements (e.g., award fees, incentives, contractual provisions, etc.).

h. Develops improved warranties and related concepts, as well as methodologies for selecting appropriate and cost-effective warranties.

i. Formulates proposed policy guidance for SAF/AQC consideration concerning the application of warranties to Air Force acquisitions. Serves as the executive secretary to the WSW Management Improvement Group as required by paragraph 14.

29. Implementing Command Program Manager (PM). The following responsibilities supplement and complement those in AFR 800-2. The PM:

a. Establishes and implements a WSW program as part of the overall acquisition or modification process, as prescribed in this regulation and FAR, Subpart 46.7, as supplemented.

b. Structures and establishes an effective warranty team to develop and coordinate the program's WSW requirements as required by this regulation.

c. Ensures that the WSW plan is developed, thoroughly coordinated, and approved as required by this regulation.

d. Designates the WSW manager and identifies specific functions and responsibilities assigned to the WSW manager. Delegates authority to the WSW manager to carry out WSW program taskings and requirements. As a minimum, the WSW manager must be tasked to:

(1) Manage and integrate the performance, operational, and support requirements of the using, supporting, and other participating commands in WSW contract development efforts and the planning for administration of the warranted systems.

(2) Manage and coordinate warranty application, enforcement, and administrative requirements to include warranted item identification, processing, deficiency reporting, data collection, and item disposition.

(3) Coordinate and resolve disputes concerning warranty program requirements in conjunction with the appropriate contracting or contract administration office, field or depot action points, legal offices, etc.

(4) Inform the PM of WSW program status and problem areas requiring special attention or support from higher headquarters or other participating commands.

(5) Coordinate planning for and ensure a smooth transition of warranty management responsibility transfer as a part of the PMRT planning and implementation effort.

(6) Provide a copy of the approved warranty plan to the USAF PPAC.

BY ORDER OF THE SECRETARY OF THE AIR FORCE

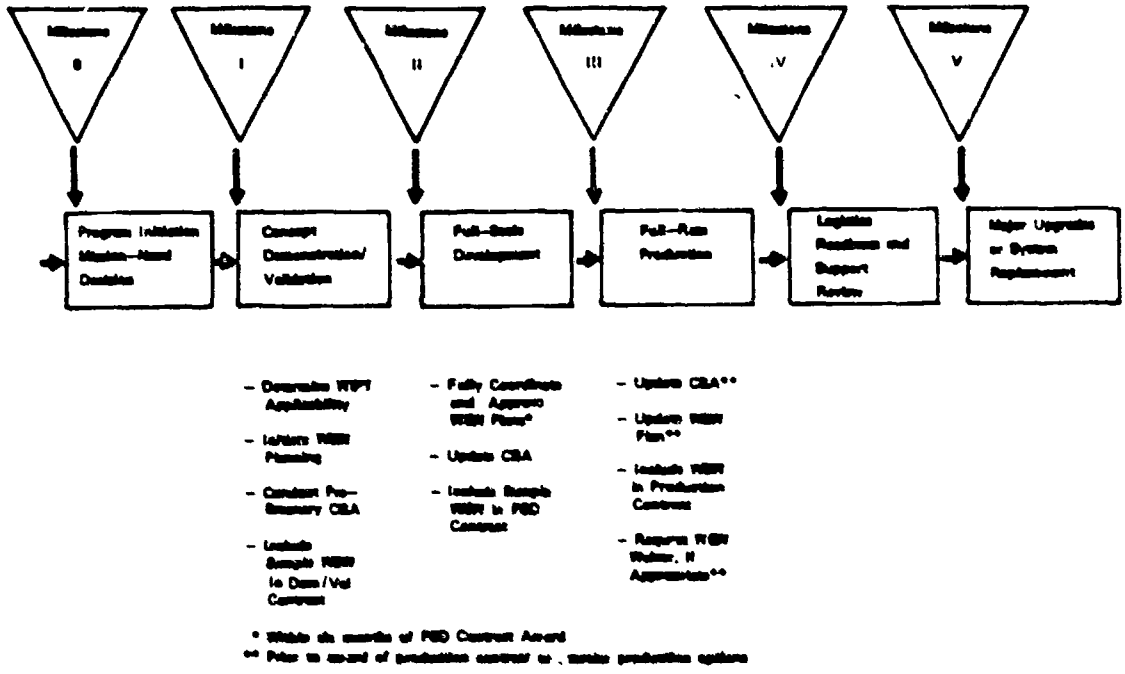
OFFICIAL

LARRY D. WELCH, General,USAF
Chief of Staff

WILLIAM O. NATIONS, Colonel,USAF
Director of Information Management
and Administration

WSWs AND THE SYSTEM LIFE CYCLE

The warranty plan must be approved within 6 months of the award of the FSD contract and uypdated as appropriate for the initial and follow-on production contracts.



AFR 70-11 Attachment 2 1 Decmeber 1988

WSW PLAN REQUIREMENTS

Warranty plans must be developed by the implementing command program office and coordinated with using and supporting commands, as well as the cognizant contract administration office and other organizations which are tasked in the plan for WSW support. The program manager has overall responsibility for warranty planning and the establishment of the warranty team to prepare and coordinate the plan.

The warranty plan must be approved by the program manager within 6 months after FSD contract award, and updated as needed to provide warranty implementation requirements for fielding the warranted item. The warranty plan must also be updated to reflect any change in requirements prior to the award of follow-on production contracts.

The warranty plan must address the following:

1. Acquisition Background. Describe the weapon system being acquired. Summarize the program and warranty history to date, including an explanation of why DFARS, Subpart 46.770, applies.

2. WSW Clause. Attach the proposed warranty clause to the plan and identify here any special considerations or constraints affecting selection of the terms and conditions. The clause must address the requirements of Attachment 3 to this regulation or rationale provided in the WSW plan for the exclusion of any of those requirement(s).

3. Cost-Benefit Analysis (CBA). Describe the CBA methodology used and summarize the CBA results.

4. Warranty Administration. Describe the specific requirements (e.g., markings) to administer the warranty as identified by Attachment 4 to this regulation. Ensure that the administrative requirements of the proposed warranty clause are consistent with this section of the plan.

5. Warranty Team Membership. Describe the warranty team organizational and management responsibilities. List the team membership (e.g., warranty manager, contracting officers, engineers, logisticians, cost analysts, using and supporting command representatives, and other points of contact deemed necessary for warranty administration).

6. Program Management Responsibility Transfer (PMRT). When applicable, identify the planned approach to transition warranty enforcement and administration responsibilities from the implementing command to the supporting command and summarize the CBA results at this point in the program.

7. Foreign Military Sales (FMS). If a WSW is to be obtained for an FMS purchaser, the FMS purchaser's warranty requirements and the Air Force plan to obtain those requirements should be discussed here. A separate FMS warranty plan may be developed if the FMS purchaser has requested unique warranty requirements that dictate the need for more detailed planning.

8. Contractor Support. If contractor support (e.g., contractor logistics support (CLS) or interim contractor support (ICS)) is planned, ensure that the support requirements are clearly defined, compatible with the WSW, and the related costs of each (i.e., the WSW and ICS or CLS) are segregated for accounting purposes.

9. Schedule. Identify key events and dates such as delivery dates, warranty periods, CBA accomplishment and updates, etc.

WSW CLAUSE DEVELOPMENT

The terms and conditions of the WSW must be tailored to the weapon system and must be as clear and simple as possible with emphasis on enforcement of the warranty conditions through existing Air Force management, administration, and logistics processes. The following requirements must be included in the warranty terms and conditions unless the warranty plan provides rationale for the exclusion of the requirement and approval has been granted, if required:

1. Define key terms such as, acceptance, defect, correction,remedy, etc.

2. Incorporate the three guarantees required by Title 10, U.S.C., Section 2403, as addressed in DFARS, Subpart 46.770-2, and paragraph 4b of this regulation, unless a waiver is granted.

3. Describe the roles and responsibilities of the government and contractor in the warranty process.

4. Identify the production units covered by each of the three parts of the warranty and the units, if any, excluded from the warranty coverage.

5. To the maximum extent possible, state the warranty duration as a fixed period of time from date of delivery WSW duration must be of sufficient length to determine that the WSW requirements have been achieved. When the duration is based on item utilization rather than calendar time, appropriate measuring devices or techniques (e.g., elapsed time indicator, cycle counter) must be required. Warranty duration should allow for those anticipated non-operational activities after delivery such as, transportation, storage or shelf-life, and redistribution. Other warranty duration considerations that should be addressed are whether:

a. Warranty duration applies to an individual unit or to a group or subgroup.

b. Warranty duration starts with acceptance (delivery) or at time of installation of the unit in a higher level of assembly.

c. Warranty period can be extended and under what conditions (e.g., to compensate for warranty time lost while a defective unit was being repaired or replaced).

6. Describe the EPRs to be warranted. Include a description of how they are to be measured, when they are to be verified, and any special testing and test equipment required to complete the verification. Also identify the contractor's role and responsibility in the verification.

7. All warranted items must be marked in accordance with MIL-STD-129, Marking for Shipments and Storage, and MIL-STD-130, Identification Marking of US Military Property, except for items which cannot be effectively marked. Markings must be located in a manner so as to be conspicuous to the person removing the item from service, and the period or conditions of the warranty must be specifically stated (e.g., landings, flight hours, operating hours, days from shipping, date of expiration, etc.).

8. Describe the remedies available to the government if the contractor breaches the WSW. Conditions for invoking a particular remedy should be addressed. When contractor repair is stipulated as an authorized remedy, also stipulate the required turn around time from contractor receipt of the failed item to contractor shipment or government acceptance of the repaired or replacement serviceable item. Also indicate the government remedy should the contractor fail to meet the guaranteed turn around time. If government repair of the hardware or associated software is to be authorized as a part of the stipulated remedies, clearly identify the conditions, limitations, and exclusions that apply as well as the repair rates at which the contractor will reimburse the government for government repaired items. Also, the WSW must state whether redesign is a remedy and under what circumstances it would be invoked.

9. Describe all warranty data and report requirements and include appropriate contract data requirements list (CDRL) for distribution to the cognizant contracting, engineering, logistics, and test activities.

10. Address the impact on the warranty should the government determine to break out any of the weapon system's component parts or use other qualified spare parts in the repair of the warranted system.

11. Identify any exclusions such as, mishandling, fire, combat damage, etc., (see DFARS, Subpart 46.770-3, as supplemented).

12. Identify any limitations such as the contractor's financial liability (see DFARS, Subpart 46.770-3, as supplemented).

13. Establish warranty terms and conditions consistent with the weapon system's operational and maintenance concept and the warranty administration requirements in Attachment 4. Do not require additional government inspections, measurements, data collection, or other unique administrative processes to enforce the warranty unless demonstrated to be cost effective in the CBA, coordinated in the WSW plan, and a waiver was obtained as required in Attachment 4 for new data systems.

14. Include a statement that the warranty does not limit the government's rights under any other contract clause.

15. Establish packaging and handling requirements for warranted items according to the level of protection as specified in MIL-STD-2073-1A or as specified in a government approved special packaging instruction. Packaging and handling costs are not directly reimbursable to the government, but should be considered in the remedy for correction of failed warranted items.

16. Establish transportation requirements after obtaining traffic management office (TMO) advice as required by DFARS, Subpart 47.101. The program office and TMO must consider the following in developing transportation requirements:

a. The government arranges and bears actual transportation costs of US Government-owned assets that are returned to the contractor for correction or replacement of defective or nonconforming parts, and the contractor reimburses the government at a pre-negotiated reduction in contract price for each return of a failed or defected warranted item.

b. Assets are to be shipped on Second Destination Transportation (SDT) funds via a mode that will ensure delivery to the final destination within the timeframes of the Uniform Material Movement and Issue Priority System (UMMIPS).

c. Transportation costs incurred for the movement of foreign military sales assets to or from the contractor for correction or replacement of defective or nonconforming parts are charged to the foreign country.

17. Describe the process for determining the impact on the WSW of approving a waiver or deviation to a requirement in the contract specification and for determining an equitable adjustment, if any to contract price.

18. Address the prime contractor's responsibility for warranting any property furnished to the contractor as government-furnished property (GFP) (see DFARS, Subpart 46.770-5).

WSW ADMINISTRATION REQUIREMENTS

1. The warranty administration process begins with contract award and ends when all item warranties have expired and all warranty claims have been settled. Warranty administration requirements must be established to ensure that warranted items are properly identified and defective warranted items are reported, controlled, and corrected under the terms of the contract. A WSW normally includes coverage for essential performance requirements (EPR), defects in materials and workmanship, and nonconformance to design and manufacturing requirements

2. The following general management requirements must be established to ensure an effective warranty administration program:

a. Organization:

(1) A warranty manager is designated by the implementing command program manager to administer, coordinate, and control the administration of warranted systems. The warranty manager coordinates with the appropriate government and contractor organizations to resolve warranty claims and correct warranted deficiencies. Warranty management responsibility may transfer or be assigned to the supporting command as agreed to in the warranty plan and PMRT agreement. When warranty management responsibility transfers to the supporting command, the supporting command must designate a WSW manager to administer the remaining term of the WSW.

(2) Field and depot organizations operating and maintaining warranted weapon systems designate warranty action points to coordinate the delivery of weapon system performance data and the identification of deficient warranted items to the warranty manager. These organizations must identify defective items covered by the warranty and initiate deficiency reports as required below. Field and depot organizations should not attempt to repair the warranted item unless government repair is authorized under the terms of the warranty.

b. Warranty Administration Management Systems.Program offices must establish manual or automated management systems to administer WSWs. These systems must be capable of accepting weapon system field performance data to determine whether or not EPRs are achieved. They must also be capable of tracking defective warranted items to ensure that deficiencies are corrected according to the contract remedies. Program offices should contact the USAF Product Performance Agreement Center (PPAC) to locate available government developed warranty management systems. Government costs to develop new or modified automated systems must be factored into the WSW CBA.

c. Field Level Warranty Information and Orientation:

(1) General Warranty Information.The USAF Technical Order System may be used to provide field and depot support organizations general information concerning the contractual warranty requirements. Operational supplements, technical order (change) page supplements (TOPS), or supplemental manuals to the appropriate system or item technical order(s) as agreed to in the WSW plan should describe the general warranty parameters and how they are to be measured or tracked, describe or provide a picture of standard warranty markings and indicate where they are normally located on the item, indicate the authorized level of repair for warranted items, and identify those warranted systems or items subject to deficiency reporting in accordance with TO 00-35D-54. Work unit code (WUC) manuals may also be used to identify those systems or subsystems subject to a warranty. Warranty coded WUCs provide a basis to identify field removal or repair actions on these systems or subsystems. The WSW plan must specify how the TO System is to be used to provide warranty administration information.

(2) Warranty Orientation and Training. For newly fielded weapon systems, a warranty orientation and training program must be established for all personnel who will have responsibilities for administering warranted weapon systems. This orientation may be contractor conducted (but closely monitored by the government) or included as part of government provided special training programs. This orientation and training should be based on the approved WSW Plan as updated to reflect field implementation requirements. The program manager, in conjunction with the using command(s), training commands, and supporting command must develop source materials or contractor requirements for this effort.

3. Administrative Requirements for the EPR Warranty:

a. The WSW EPR coverage requires the collection and evaluation of weapon system performance data against specified contract performance parameters. If the weapon system fails to achieve the specified EPR, then a remedy is due to the government. Normally, this includes contractor repair, replacement, or redesign of subsystems or parts which failed and thereby caused the weapon system to fall short of its warranted EPR. Exact identification of those parts subject to no cost contractor repair, versus those which failed within EPR parameter is not accomplished at the field level. Rather, the program office or warranty manager must:

(1) Establish procedures to ensure that failed parts are turned in to supply and shipped to the contractor for repair or replacement.

(2) Identify those failures related to the EPR value that are to be repaired by the contractor at no cost to the government, and identify those failures for which the government will bear the cost of repair.

b. EPR warranties must be designed so that EPRs can be measured by standard Air Force operational and maintenance data collection systems such as the Core Automated Maintenance System (CAMS), Reliability and Maintainability Information System (REMIS), Comprehensive Engine Management System (CEMS), or Combat Ammunition System (CAS). Elapsed time indicators (ETI) and integrated flight data recording devices may be used to provide associated performance data as appropriate (see AFR 66-6 for the application and use of ETIs). Changes to the above automated maintenance data collection systems solely to accommodate warranty performance data collection must be approved by HQ USAF/LEY. Specialized, automated, or weapon system unique field data collection systems will not be developed or implemented for warranty performance measurement without the prior approval of HQ USAF/LEY.

c. Requirements for weapon system performance data must be identified in the WSW Plan and thoroughly coordinated with the using and supporting commands prior to production contract award. Evaluation of performance data to determine whether the warranted system meets the EPR must be accomplished by the WSW manager with assistance from the using and supporting command as agreed to in the WSW Plan.

d. If the remedy for failure to meet a specified EPR includes contractor replacement and repair of failed parts, the WSW manager must be able to determine which parts are subject to no cost contractor repair. In addition, if government repair is authorized for these parts, then the program office must incorporate negotiated repair rates in the WSW clause at which the contractor will reimburse the government for government repaired items. Data required to identify specific failures and repair actions should be collected by the review of:

(1) AFTO Forms 349 (Maintenance Data Collection Record) or similar CAMS input records with warranty suffix (W) in work unit code block.

(2) Contractor corrective action or failure analysis reports.

(3.)Warranty coded service reports or deficiency reports.

NOTE: Field activities will not submit warranty coded service reports or deficiency reports for failed parts to evaluate EPR performance unless this approach is shown to be the most cost effective for the government and the using command agrees to this requirement in the WSW plan.

(4) Other reports as identified and agreed to in the approved WSW Plan.

4. Administrative Requirements for Warranties Covering Defects in Materiel and Workmanship and Nonconformity to Design and Manufacturing Requirements:

a. General.As indicated above, the failure of a weapon system to meet its EPR requirements is identified through the evaluation of weapon system performance data. However, defects in materiel and workmanship and nonconformance to design and manufacturing requirements are identified as a result of personal inspection and evaluation of a part in its intended use. Normally these types of engineering, manufacturing, or quality deficiencies are discovered as a result of a system or part failure. Warranted weapon systems with defects in materials and workmanship and nonconformance to design and manufacturing requirements must be identified, reported, and processed as indicated below.

b. Failure Reporting and Processing Requirements for Defective Warranted Items:

(1) Warranty-coded service reports (W-SR) or warranty-coded deficiency reports (W-DR)

must be prepared and submitted for defective or nonconforming warranted items when required by the warranty instructions contained in the system or component level technical order. A W-SR or W-DR is normally a Service Report (SR), Material Deficiency Report (MDR), Quality Deficiency Report (QDR), or Software Deficiency Report (SDR) with a warranty "yes" indicated in block 19 of the report. If a SR, MDR, QDR, or SDR is not required for a failed part, then a separate warranty deficiency report (WDR) is prepared. The W-SR, W-DR, or WDR is prepared according to TO 00-35D-54. Generally, the W-SR is prepared for those acquisition programs managed by the implementing command prior to PMRT or those systems undergoing test and evaluation as defined by AFR 80-14. After PMRT, W-DRs or WDRs are submitted to the supporting command (AFLC). The W-SR, W-DR, or WDR is prepared by those field and depot organizations responsible for operating and maintaining warranted weapon systems upon discovery of failed or nonconforming warranted items and prior to the turn-in of the failed item.

(2) Action points must determine whether further examination and investigation are required; i.e., service reporting or materiel deficiency reporting, over and above the failure analysis and reporting requirements of the warranty in accordance with TO 00-35D-54. If such investigation is required, the processing and disposition of the W-SR, W-DR, or WDR and the warranted item (exhibit) must be coordinated with the warranty manager as outlined in TO-00-35D-54.

(3) If a weapon system, subsystem, or part is not identified as warranted for defects in materials and workmanship and nonconformance to design and manufacturing requirements as required by this regulation, i.e., labels, work unit codes, etc., then field activities may assume that no warranty exists and, therefore, no W-SR or WDR is required. If an item is properly marked as warranted, and the warranty instructions in the applicable technical order supplement direct submission of W-SRs, W-DRs, or WDRs, a W-SR, W-DR, or WDR must then be submitted to the action point as required by TO-00-35D-54. The action point provides copies of W-SRs, W-DRs, and WDRs to the warranty manager and coordinates all action with the warranty manager.

(4) Upon receipt of the W-SR, W-DR, or WDR, the WSW manager completes an investigation as part of the warranty corrective action and provides disposition instructions through the action point to the originating and screening points. Normally, predisposition instructions will be provided to the originating and screening points to avoid delays and to expedite the warranted item processing.

(5) Defective warranted items are controlled, e.g., handled, received, stored, shipped, and processed in accordance with TO 00-35D-54; AFM 67-1, Volume 1, Part One, Chapter 10, section J; and AFM 67-1, Volume II, Part Two, Chapters 10 (Receipt Processing), 11 (Issue Systems), and 15 (Shipment); as appropriate. Close coordination with the action point and warranty manager is required to ensure timely processing, proper identification and storage, proper packaging and transportation, and other administrative requirements are completed to ensure that the full benefit of the warranty is obtained by the government.

(6) Warranted items, i.e., covered by materials and workmanship and design and manufacturing warranties, must be marked according to MIL-STD-130 and item containers must be marked according to MIL-STD-129. Warranty items must be packaged according to the requirements of the original contract, MIL-STD-2073-1A, or any Air Force special packaging instruction per AFR 71-9. For defective warranty items, the level of preservation and packaging must be those specified for unserviceable condition items.

c. Warranty Corrective Action.The warranty manager notifies the appropriate government and contractor activities, in coordination with the appropriate contracting officer, that a defective warranted item has been identified and that corrective action or remedy under the terms of the warranty is required. Corrective action or remedy may include: return and no cost repair or replacement of the item by the contractor, repair by government activity with defective component(s) returned to the contractor for no cost repair or replacement, repair by government activity with compensation or contract price reduction, or other remedies as provided for in the warranty terms and conditions.

NOTE: In the event that operational mission requirements preclude executing the corrective action or remedy under the terms of the warranty, the action point must document the circumstances and rationale for the action and provide a written notification of such action to the warranty manager. This action must be approved in advance by the unit commander or his or her designated responsible officer. This approval

may not be delegated lower than the Deputy for Maintenance, Deputy for Resource Management, or equivalent level officer.

d. Warranted Item Accountability.Accountability for defective warranted items which are returned to the contractor for repair, replacement, or investigation must be maintained by the government. WSW managers, in conjunction with the appropriate contract administration office, must maintain cognizance over warranted items shipped from government installations to contractors facilities for repair or replacement. Repaired warranted items must be returned to the government within the time frame established by the warranty and with the proper markings to indicate the new warranty period of performance.

e. Commercial Item Warranties.Commercial off-the-shelf items that are an integral part or subsystem to the weapon system being procured for which a warranty is required, must be identified, controlled, and administered under the warranty provisions in the weapon system contract and as indicated herein. Warranty administration procedures contained herein should be used to the maximum extent possible for all other commercial off-the-shelf items which have a standard commercial warranty.

WSW USAGE REPORT FORMAT
(RCS:HAF-AQC(SA)(8701)

PART I - Weapon System Warranties.

For each production contract for a weapon system that includes the warranty required by Title 10, U.S.C., Section 2403, as implemented by DFARS, Subpart 46.770-2, the following data is required:

A. System Nomenclature: (F-15, GBU-15, Peacekeeper etc.)

B. Warranty Scope: (System/subsystem covered by the warranty, such as Inertial Navigation Unit, Engine, etc.)

C. Contract Number:

D. Contractor:

E. Contract Value: (Including priced options.)

F. System/subsystem Quantity: (Total number of warranted systems or subsystems.)

G. Warranty Costs: (As set forth in an applicable contract line item, if separately priced; or as reflected in the government price negotiation memorandum, if estimated.)

H. Warranty Cost as a Percent of Contract Value: (Paragraph G. divided by E.)

I. Warranty Cost Cap (if any): (A cap negotiated to limit the financial liability of the contractor to correct defects.)

J. Contract Environment: (Competitive, non-competitive, etc.)

K. Warranty Provision(s): (FAR, DFARS, special provision.)

L. Warranty Coverage: (Materials and wokmanship: design and manufacturing: and/or EPR, such as, functional reliability, maintainability, availability, etc.)

M. Warranty Duration: (Calendar time; operating/flying hours; etc.)

PART II - Summary.

This part provdes an overall summary of WSW information provided under Part I.

Total No. Contracts	Total Value of Contracts	Total Warranty Costs	Total Warranty Costs as % of Total Value of Contracts
(a)	(b)	(c)	(c/b)

APPENDIX F

MARINE CORPS ORDER 4105.2

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380-0001

MCO 4105.2
LMA-4-dt
4 Nov 1987

MARINE CORPS ORDER 4105.2

From: Commandant of the Marine Corps
To: Distribution List

Subj: Marine Corps Warranty Program

Ref: (a) Public Law 98-525, Defense Procurement Reform Act of 1985 (NOTAL)
(b) Defense Federal Acquisition Regulation Supplement (DFARS) 46.7 (NOTAL)
(c) Navy Acquisition Regulation Supplement (NARSUP) 46.7 (NOTAL)
(d) DoD-Hdbk-276-1
(e) MIL-STD 881A
(f) MCO 4855.10A
(g) MCO P4000.21A
(h) MIL-STD 130
(i) MIL-STD 129
(j) NavCompt Manual, volume 4, 043108

Encl: (1) Definitions
(2) Standard Warranty Procedures
(3) Expected Failure Concept
(4) Warranty Claim Data Report Format

Report Required: Warranty Claim Data (Report Symbol MC-4105-01), par. 5b(9), and encl (4)

1. Purpose. To promulgate policy described in references (a) through (c) and assign responsibilities for the management and execution of the Marine Corps Warranty Program.

2. Background. Reference (a) added Section 2403 to Title 10 of the United States Code and requires the Department of Defense (DoD) to obtain warranties in contracts for weapon systems awarded after 1 January 1985. Specifically, the section requires that weapon systems with a unit cost of more than $100,000 or a projected total procurement cost of more than $10,000,000 possess a warranty in which the contractor warrants:

a. That the weapon system conforms to the design and manufacturing requirements specifically cited in the contract.

b. That the weapon system is free from defects in material and workmanship.

c. That the weapon system meets or exceeds the essential performance characteristics specifically delineated in the contract.

This section describes various remedies for the contracting officer should the warranty be invoked. These include: requiring the contractor to promptly take action to correct the deficiency at no additional cost to the Government or requiring the contractor to pay costs incurred by the Government to correct the problem. The law requires contracting officers to tailor warranties to fit the particular acquisition and describes criteria for waiving warranty requirements on systems acquisitions. These areas are discussed in greater detail in the following sections.

3. Objectives. The objectives of the Marine Corps Warranty Program are to ensure that the weapon systems acquired perform as required, conform to the design and manufacturing requirements specified, are free from defects in materials and workmanship, and finally, to ensure that the new weapon systems/equipment contribute to increased readiness throughout the Marine Corps.

4. Policy. The stated objectives can best be accomplished through the judicious development, acquisition, and implementation of performance assurance warranties for new weapon systems and selected equipment. The following policy is applicable for all acquisitions in which the Marine Corps is the contracting authority:

a. A warranty shall not be used as a substitute for proper logistics planning and acquisition of the elements of integrated logistics support for the system or as a means of acquiring interim contractor support. Warranty considerations shall become part of the acquisition planning process and acquisition documentation.

b. Per references (b) and (c) the Marine Corps shall acquire only those warranties demonstrated to be cost-effective. A documented cost benefit analysis shall be used to determine the cost effectiveness of a proposed warranty. Prior to performing the analysis, the Government shall require the contractor to identify all contractor costs associated with the warranty or to separately price the proposed warranty. The analysis shall become part of the contract file and program documentation.

(1) The cost benefit analysis shall be a comparison of the life cycle costs without a warranty and the life cycle costs with a warranty. The warranty cost benefit (WCB) shall be defined as the result obtained when subtracting the life cycle costs with a warranty from the life cycle costs without a warranty. If the WCB is equal to zero or is positive it may be assumed that the warranty is cost-effective. If the WCB is negative, then the warranty may be assumed not to be cost-effective and a waiver

should be requested using the procedures described in paragraph 4c, following. As a minimum, the following cost factors shall be included in the life cycle cost computation for the analysis:

(a) Estimated cost to the Government (price) of the warranty.

(b) Estimated cost for correction or replacement by the Marine Corps.

(c) Estimated cost for correction or replacement by another source.

(d) Indirect costs incurred by the Marine Corps to maintain the warranty in effect. Examples of indirect costs include, but are not limited to; costs of warranty defaults, reduced opportunities for breakout, and reduced opportunities for competition.

(e) All administrative costs associated with tracking and processing warranty claims, maintaining warranty related records, and reporting of warranty related information. (Note: reference (d) can be used to perform the analysis in the detail necessary.)

c. When determined to be cost-effective, the Marine Corps shall acquire warranties on weapon systems/equipment that meet the following criteria, unless a waiver of the warranty requirement has been approved by the Assistant Secretary of the Navy (Shipbuilding and Logistics) (ASN(S&L)). A warranty is required if the system or equipment:

(1) Is a weapon system, as defined in enclosure (1), with a unit cost exceeding $100,000 or with a projected total procurement cost exceeding $10,000,000.

(2) Is an item subordinate to the weapon system level and:

(a) Falls within the cost criteria described in paragraph 4c(1). These items would include major components of the system or other equipment integrated to form a system. Spare parts will not be subject to warranties under this Order.

(b) Occurs no lower than level 3 of the work breakdown structure of the system. (Refer to reference (e)).

(c) Is not reparable at a level lower than fourth echelon.

d. When the Principal Development Activity (PDA) or contracting authority is other than the Marine Corps, the Marine Corps shall provide its warranty requirements to the PDA or contracting authority for inclusion in the contract. In the event the other service PDA or contracting authority has developed warranty provisions for the proposed contract the Marine Corps shall acquire that warranty as long as it does not violate the policy described herein. The policy described herein is not applicable to weapon systems/ equipment procured and supported totally through Navy appropriations (i.e., aviation weapon systems and equipment) but may be used for guidance in structuring warranty provisions for those systems/equipment.

e. The Marine Corps shall tailor warranties, consistent with the requirements of this Order, to meet the unique circumstances of each acquisition. Warranties acquired by the Marine Corps shall generally provide for two types of coverage; these are, systemic defect and individual item failure coverage.

(1) Systemic defect coverage provides coverage for the entire weapon system. This level of coverage is appropriate when describing essential performance characteristics for the system. Indicators of systemic deficiencies are frequent Quality Deficiency Reports (QDP) on particular parts of the system or the system itself that establish a trend of failures indicating a possible design deficiency as well as the inability of the system to meet the contractually specified essential performance characteristics. When systemic defects exist, the warranty remedy should call for total asset remedies which could take the form of recalls, repairs, contract price reductions, or combinations of these.

(2) Individual item coverage refers to the coverage extended to those components reparable at the 4th echelon or higher and those warranted parts occurring at/or above level 3 of the work breakdown structure. Items selected for individual item warranties should normally be high dollar components.

f. Warranties shall be acquired for equipment that does not meet the definition of a weapon system only when they are demonstrated to be cost-effective.

g. Commercial warranties are often available when procuring nondevelopmental items. In cases where a commercial warranty is available it will normally be acquired instead of negotiating a separate warranty agreement. These warranties may be acquired if one of the following is true:

(1) They are cost-effective and can be executed with existing supply and maintenance procedures to include administrative procedures for tracking and executing the warranty.

(2) The warranty cost cannot be severed from the item price to effect a price reduction for the item.

* h. The Marine Corps shall seek a waiver from the ASN(S&L) when the results of the cost/benefit analysis indicate the acquisition of a warranty would not be cost-effective; when relief is desired from one of the three areas requiring warranty coverage as described in paragraph 4j, following, or when it is in the interest of the national defense not to have a warranty on a particular system. These waivers shall be initiated by the Program Manager (PM) and processed, via the Commanding General (CG), Marine Corps Research, Development, and Acquisition Command (MCRDAC), and forwarded for approval to the ASN(S&L).

i. Acquired warranties shall be compatible with existing Marine Corps supply and maintenance procedures so that support for the item, while under warranty, will not differ from the follow-on support provided after the warranty expires. Using unit participation in the implementation, execution, and administration of warranties shall be kept to a minimum; this includes minimizing the imposition of additional supply and maintenance administrative procedures for tracking and administering warranties for equipment in using units (i.e., first, second, and third echelon maintenance capable units). The following shall be considered when developing warranty terms:

(1) The requirements for storage or service of warranted items, while under warranty, shall not differ from their post warranty requirements.

(2) Supply support procedures for warranted items shall operate within the existing Marine Corps supply system.

(3) Existing Marine Corps maintenance management procedures shall be used to document maintenance on warranted items. Warranty claims shall be submitted by the warranty coordinators per enclosure (2) and the provisions of reference (f).

j. The Marine Corps shall require the contractor to warrant that the weapon system provided under the contract conforms to the design and manufacturing requirements specified in the contract; the weapon system provided under the contract is free from all defects in materials and workmanship; and the weapon system, if manufactured in mature production, conforms to the essential performance characteristics specified in the contract. References (a), (b), and (c) apply.

k. Contracts with a warranty shall contain terms that permit the contracting officer to require the contractor to take whatever corrective action is necessary at no cost to the Government to correct the deficiency, to equitably reduce the contract

price, or to require the contractor to pay costs reasonably incurred by the Government to correct the deficiency. Corrective action shall be completed within time limits specified in the contract. Contract terms shall allow the Marine Corps to repair a warranted item.

l. The Marine Corps shall not require a contractor to warrant government-furnished equipment (GFE).

m. The Marine Corps shall not seek warranties in cost reimbursement contracts.

n. The Marine Corps shall seek warranties on technical data as defined in reference (g) when it is cost-effective to do so. Warranties for technical data should be subjected to the same criteria and cost effectiveness requirements as their hardware counterparts. Warranted technical data shall be marked to indicate the warranty coverage and expiration date.

o. The Marine Corps shall use the expected failure concept detailed in enclosure (3) when developing the item warranty.

p. The duration of the warranty should be of sufficient time to ensure that those items placed in storage will have warranty protection upon placement in service. In some cases, when extended storage (storage duration to exceed 1 year) is planned for new equipment (i.e., Selected Marine Corps Reserve (SMCR) units) the Marine Corps may seek provisions in the contract that provide for extended warranty coverage for equipment placed in extended storage.

(1) The warranty duration shall be expressed in two terms, the first being some measure of operational use such as miles, hours of operation, rounds fired, etc. which is sufficient in quantity to ensure the quality of the system/equipment. The second term shall be a period of time extending from the date of acceptance for a period of days, months, or years into the future during which the Government may seek remedies as defined in the contract to deficiencies in the system. For example, a new truck is being fielded with several vehicles in the first production lot destined for delivery to the Maritime Prepositioned Ship (MPS) Program for at least 1 year of storage. Average yearly mileage for the truck is 12,000 miles and at least 1 year of warranty protection is desired for all operational vehicles. The warranty duration might read, "12,000 miles or 24 months whichever comes first." This would permit storage of some vehicles for up to 1 year and still allow for warranty coverage when put into operation. Those vehicles immediately put into operation would have up to 24 months of warranty protection as long as their mileage remained under the 12,000-mile limit.

(2) The warranties on individual items within a warranted system shall not have durations beyond that of the system warranty. In addition, if a warranted item is replaced prior to the expiration of the system warranty, the remaining duration on the individual item warranty shall not exceed the duration remaining on the system warranty. For example, a truck with a 24-month warranty on the entire vehicle also has individual item coverage for the engine for a period of 24 months. The engine fails and is replaced 18 months into its life. The new engine only has 6 months of warranty coverage remaining.

q. Items covered under a warranty shall be marked with the following information at a minimum: "WARRANTY ITEM," production contract number, production lot number, and expiration date/usage factor for the warranty for that production lot. For further information on the marking of warranted items, refer to references (h) and (i).

r. The Marine Corps shall tailor warranties to meet the unique circumstances of each acquisition.

(1) During the tailoring process the Marine Corps shall seek to limit systemic coverage to between three and seven essential performance characteristics; one of which shall be a system level reliability value accompanied by clear definitions of system failures.

(2) Individual item warranty coverage for parts of the system shall be limited to those items reparable at fourth or fifth echelon maintenance or appear no lower than level 3 of the work breakdown structure.

(3) During the tailoring process the Marine Corps shall use the expected failure concept described in enclosure (3) as the principal means of structuring the warranty. In some commercial warranties tailoring may not be possible. In these cases a failure-free warranty may be more appropriate.

s. The Marine Corps shall collect information on the use of warranties for analysis and reporting. This information shall include identification of the contract, the contractor, a summary of claim activity for the reporting period, and the cumulative claim activity for the contract. Claim activity shall include claims submitted, honored, disputed, denied, and the value of each category. Denied claims shall include the reason for denial and failure cause, if known.

t. The Marine Corps shall ensure that one or more of the following remedies are available to the Government when a warranty is breached for a weapon system or equipment. These remedies shall be clearly described in the provisions of the contract.

(1) In cases where a production contract is still in place, the Marine Corps shall seek to equitably reduce the contract price in an amount equal to the cost of parts, transportation costs, handling costs, and labor costs if any are involved. For ease of administration, the reductions should be accomplished in block modifications to the contract on a quarterly or semi-annual basis as specified in the contract.

(2) If a production contract is not in place, the Marine Corps shall seek replacement of the faulty parts or components covered by the warranty. If labor costs are involved, the contracting officer shall seek additional spares in type to the ones that failed and in an amount equal to the value of the labor costs incurred in lieu of receiving monetary reimbursement for the items. Transportation and handling costs for replacing warranted items shall be borne by the contractor.

(3) Monetary reimbursements for parts, labor, and other costs shall be considered to represent a reduction in the contract price or an overpayment to the contractor. As such, the proceeds shall be collected and accounted for using procedures described in reference (j). These proceeds shall revert to the appropriation or appropriations concerned when the issue of reimbursement is covered by an agreement between the contracting parties. Monetary reimbursements shall be addressed in the warranty provisions of the contract.

(4) When the system fails to meet its essential performance characteristics as evidenced by a trend analysis of QDRs, by the systems failure to perform as required, or when the number of system failures exceeds the threshold established for the system, the Marine Corps/Government agent shall seek redesign of the component, subsystems, or system (as necessary) to ensure the system conforms to the essential performance characteristics described in the contract. Additionally, the contractor shall be required to bear the costs of modifying existing inventory (end items and spare parts) to correct the deficiency. Such redesign, testing, modification, and related costs shall be borne by the contractor. Provisions for warranty coverage of redesigned components, subsystems, or system should be described in the contract.

(5) Warranty remedies shall not be any less responsive than normal Marine Corps supply and maintenance turnaround times. Responsiveness in terms of time between the warranty claim notification and resolution shall be addressed in the warranty provisions of the contract.

u. Warranty procedures shall allow for the Marine Corps to effect its own repairs without voiding the remaining warranty.

The cost of Marine Corps repair of a defect which is covered by the warranty shall be at the contractor's expense.

v. Warranty procedures identified in enclosure (2) shall be tailored to the designated equipment and included in an advance logistics order (ALO).

5. Responsibilities

a. The CMC is responsible for the following:

(1) The CMC (L) shall:

* (a) Issue policy for the technical and statutory requirements of warranties for Marine Corps acquired items (L).

* (b) Issue policy regarding data collection and reporting used to identify warranties, determine compliance, and ensure that acquired warranties are compatible with standard Marine Corps supply and maintenance procedures (L).

* b. The CG MCRDAC shall:

* (1) Assist PMs in the preparation and tailoring of warranty provisions for systems and equipment (PSI-L).

* (2) Review and forward for approval to the ASN(S&L) all requests for waivers to the warranty requirements identified in reference (b) and maintain copies of all requests as part of the program documentation.

* (3) Review trend analyses of QDRs submitted by Marine Corps Logistics Base (MCLB), Albany, to determine if essential performance characteristics are being met or a design deficiency exists (PSI-G).

* (4) Develop policy for the technical and statutory requirements of warranties, data collection, and compliance determination for the warranty program (PSI-L).

* (5) The PM shall:

(a) Identify within an ALO the following information: the essential performance characteristics included in the warranty, the national stock number (NSN) of individual warranted items, the duration of the warranties, and a description of the warranties at the system or individual item level. Identify any procedures that deviate from existing ones in implementing, executing, reporting, or administering the warranty.

(b) Provide warranty execution training as an integral part of the fielding/new equipment training process for the item with emphasis on procedural differences that may be required due to geographic, organizational, or mission differences of the using units.

(c) Ensure that a cost-benefit analysis is performed to determine the cost effectiveness of a proposed warranty.

(d) Document and retain in the Master Acquisition Plan (MAP) and contract file (see reference (c)), the cost benefit analyses performed in the decision process to acquire or not acquire a warranty for the acquisition.

(e) Request waivers for warranties on weapon systems/ equipment when the proposed warranty is not cost-effective or in the best interest of the Government. Copies of those requests shall be maintained as part of the program's documentation. Such waivers shall include the following information as a minimum:

1 A description of the system and its state of production as well as the number of units delivered and anticipated to be delivered during the life of the program.

2 The specific warranty or warranties for which the waiver is requested, the duration of the waiver (if it extends beyond the contract under consideration), and the rationale for the waiver. Include in the rationale a statement describing the cost effectiveness of the warranty. This statement shall reference the analysis performed and documented to substantiate it.

3 A summary of the assumptions, cost factors, benefits, and conclusions contained in the cost benefit analysis. Identify who performed the analysis.

4 A description of the techniques to be employed to assure acceptable field performance of the weapon system.

(f) Ensure that procurement work orders (PWO) contain sufficient information on the equipment and the warranty desired to develop a warranty clause, a copy of the proposed warranty provision, or a copy of the approved waiver of the warranty requirement.

* (g) Provide the CG MCRDAC with recommended essential performance characteristics.

* (6) Approve the essential performance characteristics to be warranted by the contractor.

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c. The CG MCLB Albany shall:

(1) Establish a warranty information data base for the collection and tracking of warranty claim and usage data to provide the information required for warranty assessments and reporting.

(2) Act as the Marine Corps warranty administrator between the Marine Corps and contractor or administrative contracting officer (ACO)/principal contracting officer when a weapon system and/or components are to be supported by commercial or negotiated warranties.

(3) Ensure that the procedures in enclosure (2) are used to notify contracting officers of warranty claims.

* (4) Review draft ALOs to ensure the adequacy of warranty information. Provide comments and recommendations to the CG MCRDAC (PSI-L) to correct any deficiencies identified.

(5) Receive, from contractors, monetary reimbursements and parts resulting from warranty claims.

* (6) Conduct trend analyses of QDRs submitted per reference (f) to determine if warranted essential performance characteristics of the weapon system and/or components are being met. Advise the CG MCRDAC (PSI-G and the PM) of those instances where the trend analyses indicate the specified essential performance characteristics are not being met.

* (7) Forward the results of the trend analyses of QDRs to the CG MCRDAC (PSI-G) along with a determination of whether or not the failures are the result of design or manufacturing defects.

(8) As the warranty administrator collects the information required in paragraph 4s, preceding.

* (9) Submit a consolidated report of warranty claim and usage data in the format described in enclosure (4) to the CMC (L) and the CG MCRDAC (PSI-L) 15 days after the end of the 2d quarter (for the period 1 January through 30 June) and the 4th quarter (for the period 1 July through 31 December). This report has been assigned Report Control Symbol MC-4105-01.

(10) Program or budget funds to administer the warranty program and for repair/replacement of the support items determined after negotiations with the contractor to be excluded from coverage by the warranty.

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* d. The CGs of the Fleet Marine Forces (FMFs), 4th Marine Division (MarDiv), 4th Marine Aircraft Wing (MAW), and Marine Corps Bases (MCBs) shall:

(1) Ensure procedures are established down to the using unit implementing the warranty claim procedures identified in enclosure (2) of this Order.

(2) Designate a point of contact for an installation of predetermined command/geographical area. The number of personnel/units contacting the contractor or dealership must be kept to a minimum to preclude conflicting resolution of warranty matters. Therefore, a warranty coordinator shall be appointed by the CG FMF as the point of contact within each FMF. The FMF warranty coordinator will ensure that warranty coordinators are appointed at commands possessing fourth echelon maintenance capabilities.

(a) Continental United States (CONUS) or outside continental United States (OCONUS). Active U.S. Marine Corps units shall process warranty claims through appropriate support and maintenance channels to the warranty coordinator.

(b) SMCR. Reserve units possessing organizational maintenance capability, which are geographically separated from intermediate maintenance activities are authorized to make warranty determination and to coordinate warranty actions with the warranty administrator at MCLB Albany. Reserve units not possessing organizational maintenance capability will obtain warranty service through a supporting organizational maintenance activity.

(3) Ensure warranty claims are filed for all failures of warranted items.

(4) Ensure warranty coordinators are the focal point for coordinating all warranty actions between the using unit and local dealers or manufacturers, the warranty administrator, and contracting officers.

(5) Execute warranty procedures as described in ALOs.

(6) Maintain files and records as necessary to manage the warranty program for weapon systems and locally procured equipment.

(7) Ensure warranty coordinators provide information to the using units on warranty coverage and exclusions, clarify warranty claim issues, and provide assistance to implement the system warranties.

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MCO 4105.2
4 Nov 1987

6. Reserve Applicability. This Order is applicable to the Marine Corps Reserve.

J. J. WENT
Deputy Chief of Staff
for Installations and Logistics

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DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380-0001

MCO 4015.2 Ch 1
LA-PSI-dt
12 Apr 1988

MARINE CORPS ORDER 4105.2 Ch 1

From: Commandant of the Marine Corps
To: Distribution List

Subj: Marine Corps Warranty Program

Encl: (1) New page inserts to MCO 4105.2

1. Purpose. To transmit new page inserts to the basic Order.

2. Background. As a result of the changes to the Marine Corps acquisition organization and the activation of the Marine Corps Research, Development, and Acquisition Command (MCRDAC) specific responsibilities in the management and execution of the Marine Corps Warranty Program must be reassigned.

3. Action

a. Remove present pages 5, 6, and 9 through 12 of the basic Order and replace with corresponding pages contained in the enclosure hereto.

b. Remove present pages 3, 4, 7, and 8 of enclosure (2) and replace with corresponding pages contained in the enclosure hereto.

4. Change Notation. Paragraphs denoted by an asterisk (*) symbol contain changes not previously published.

5. Filing Instructions. This Change transmittal is filed immediately following the signature page of the basic Order.

J. J. WENT
Deputy Chief of Staff
for Installations and Logistics

DISTRIBUTION: E

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PCN 102 043051 01

DEFINITIONS

For the purpose of this Order, the following terms are defined:

1. Acceptance. The act of an authorized representative of the Government by which the Government assumes ownership of supplies tendered or approves specific services rendered as partial or complete performance of the contract.

2. Commercial Warranty. A warranty offered by a contractor that sells a substantial amount of the product being acquired by the Government to the general public. The warranty price is generally inseparable from the price of the item and there is no tailoring of the warranty provisions at the time of sale. An example of a commercial warranty would be the 90-day parts and labor warranty provided in the purchase of a new television set.

3. Cost Benefit Analysis. A process used to compare the total costs of a warranty with the benefits to be derived from that warranty. This analysis shall be conducted to identify the costs for the life cycle of the item both with and without a warranty. (Note: the DoD Life Cycle Cost Model is capable of performing that comparison. The difficult task is to identify all the associated costs and benefits and placing a dollar value on them for comparison purposes.)

4. Defect. Any condition or characteristic in any supplies or services furnished by a contractor, under a contract that is not in compliance with the requirements of the contract.

5. Design and Manufacturing Requirements. Structural and engineering plans and manufacturing particulars, including precise measurements, tolerances, materials, and finished product tests for the weapon system being produced.

6. Essential Performance Characteristics. Operating capabilities and reliability and maintenance characteristics of a weapon system/subsystem/component that are determined by the sponsor to be necessary for the system to fulfill the military requirement for which it was designed. Usually limited to three to seven characteristics that are readily measurable in an operational environment, though the number may be more if the complexity of the equipment warrants.

7. Failure-Free Warranty. A failure-free warranty requires a period of failure-free usage. Commercial and trade practices warranties are examples of this concept. (Note: under this concept, each claim is subject to the contract remedy during the warranty term. Since failures may occur, the cost of the warranty

will normally include the expense of repair or replacement that can be expected during the warranty term. This cost may be included in the item price and not identifiable as a separate cost. This type of warranty may be more appropriate when an item's reliability is unknown or unspecified as in the case of a nondevelopment item. Administration costs usually increase because the warranty claims are processed at a lower level in the maintenance chain.)

8. Incentive Warranty. A type of warranty that provides incentives for the contractor to exceed minimum design, quality, or performance levels. For example, the contract may establish increasingly higher reliability levels above the minimum requirement with monetary rewards for the contractor should his system meet these higher standards. (Note: depending upon the structure of the warranty, this may or may not meet the requirements of the Defense Procurement Reform Act.)

9. Master Acquisition Plan. The principal planning document for each Marine Corps acquisition program. It describes the proposed system, provides a historical summary, provides guidance for each detailed supporting plan and includes a list of program objectives and milestones. Additional information concerning format and contents of this plan may be found in MCO P5000.10B.

10. Mature Production. Follow-on production of a weapon system after manufacture of the lessor of the initial production quantity or one-tenth of the projected total production quantity.

11. Performance Assurance Warranty. Term used to describe a warranty in which the primary intent is to assure that minimum design, quality, and performance levels are achieved. (Note: the Government is not seeking anything more than what the contract specifies, and the warranty concept and terms and conditions do not provide any incentives for the contractor to do otherwise. This is the type of warranty required by the new Defense Procurement Reform Act described earlier.)

12. Prime Contractor. A party that enters into an agreement directly with the United States Government to furnish goods or services.

13. Transition Plan. A plan which depicts those significant events and timing of those events to assure the orderly transition of supply support from the contractor to the Marine Corps Supply System.

14. Warranty. A promise or affirmation given by a contractor to the Government regarding the nature, usefulness, or condition of the supplies or performance of services furnished under the contract.

15. Warranty Administrator. An individual within a weapon system/equipment management (WS/EM) team who has total management responsibility for all warranty claims/actions regarding a specific weapon system/equipment.

16. Warranty Coordinator. An individual assigned responsibility for coordinating warranty actions/functions required between the user and the warranty administrator. (Note: a warranty coordinator will be appointed by the CG FMFs and serves as the point of contact within the FMF on warranty issues. Warranty coordinators appointed below the FMF level will normally be located at the force service support group (FSSG), units possessing fourth echelon maintenance capability, or units whose geographic location mandates an independent warranty coordination capability.)

17. Weapon System. A system or major subsystem used directly by the Armed Forces to carry out combat missions. (Note: the term includes, but is not limited to the following, if intended for use in combat missions, tracked and wheeled combat vehicles; self-propelled, towed and fixed guns, howitzers, and mortars; helicopters; naval vessels; bomber, fighter, reconnaissance and electronic warfare aircraft; strategic and tactical missiles including launching systems; guided munitions; military surveillance, command, control, and communication systems; military cargo vehicles and aircraft; mines torpedoes; fire control systems; propulsion systems; electronic warfare systems; and safety and survival systems. This term does not include related support equipment, such as ground handling equipment, training devices and accessories; or ammunition, unless an effective warranty for the system would require inclusion of such items. This term does not include items sold in substantial quantities to the general public as described in the Federal Acquisition Regulation 15.804-3(c)).

MCO 4105.2
4 Nov 1987

STANDARD WARRANTY PROCEDURES

1. Purpose. Certain procedures must be followed by the user of equipment under warranty contracts to ensure the warranty claim system agreed upon between the Marine Corps and the contractor will function as intended. These generic procedures are intended to describe the principal features of the warranty provisions of the equipment under warranty, to provide instruction defining the process of securing warranty services and/or parts covered under the warranty, and to illustrate the proper method of processing warrarty claims for service and/or parts. Specific warranty procedures tailored to individual equipment will be included in the applicable contract and promulgated in the equipment's ALO.

2. Guidance. Maximum cooperation between contractors, or their representatives, and the warranty administrator at MCLB Albany is desired and necessary. The warranty coordinator should not participate in warranty disputes. Warranty disputes should not cause repair of equipment to be held in abeyance pending resolution of disputes. Follow the local standing operating procedures (SOP) and the procedures detailed in this document when there is sufficient evidence that a warranted part is defective and that replacement parts and/or services or reimbursement is due the Marine Corps. All disputes will be transmitted from the warranty coordinator to the warranty administrator at MCLB Albany for evaluation and review. Disputes requiring resolution will then be forwarded to the contracting officer for appropriate action.

3. General Equipment Warranty

a. A weapon system contract requires three specific warranties, one covering design and manufacturing requirements, one covering defects in materials and workmanship, and one covering essential performance requirements delineated in the contract.

b. A warranty does not cover conditions resulting from misuse, failure to perform scheduled maintenance, or improper preservation during equipment storage. The warranty does not cover the replacement of consumable/expendable items (such as filters and lubricating oils) used in connection with normal maintenance services.

c. Upon receipt of the equipment, or as appropriate, the commencement dates of the warranty must be recorded in the remarks portion of the equipment record jacket NAVMC 696D (Motor Vehicle and Engineer Equipment Record Folder) or as directed if the equipment record jacket is not used; i.e., if the Weapons Record Book Part 1 is used in lieu of the record jacket.

ENCLOSURE (2)

d. Prior to placing new equipment in storage and again at the time of its withdrawal from storage, the contractor must be notified through the warranty administrator at MCLB Albany. For this action, use the equipment storage report formats which are provided with each end item when it leaves the contractor's facility. An equipment storage report must be partially prepared for each newly delivered equipment placed in government storage, and completed when each equipment is removed from storage and placed in service. It must be prepared properly and submitted within the following time schedules so the Government can fully realize the intended warranty benefits:

(1) In storage - 15 days

(2) In service - 5 days

e. In the event of a warranted failure, the warranty coordinator may be required to deliver the equipment to an authorized dealership or warranty service shop.

4. Notification of Warranty Defect

a. The using unit will immediately notify the warranty coordinator when a warranted item has failed. The warranty coordinator at the designated command/area shall notify the warranty administrator immediately thereafter. Such notification may be either telephonic or in writing. Any telephone notification will be followed by an SF 368 (Product Quality Deficiency Report) prepared per the current edition of MCO 4855.10. An information copy of the written notification, SF 368, will be provided to the FMF warranty coordinator. When repair is being accomplished by the Marine Corps, it will be so stated on the SF 368.

b. Warranty coordinators will receive copies of all warranty-related SF 368 message QDRs. They will have the responsibility for the planning, execution, and monitoring of all warranty matters within the designated command/area. They will possess an overall perspective of the warranty related problems of the using units within the designated command/area.

c. The warranty administrator shall notify the contracting officer within 5 working days after notification of a defect.

d. The contracting officer shall provide disposition instructions to the warranty administrator within 5 working days after receiving the notification of defect.

e. Upon receipt of disposition instructions from the contracting officer or contractor, the warranty administrator will notify the appropriate command of required actions within 2 days.

f. Under the warranty, the Marine Corps should normally have the unilateral right to effect its own repair. If the Marine Corps elects to effect warranty repair or replacement itself, the following will be done:

(1) The warranty coordinator will notify the warranty administrator within 10 working days after repair is complete. This notification will include the original SF 368 and the pink/photo copy of the equipment repair order (ERO)/ERO shopping list (EROSL) associated with that ERO.

(2) The contracting officer or the contractor shall be notified by the warranty administrator within 30 days after discovery of the defects per paragraphs 4a and b, preceding.

(3) The contracting officer or contractor shall provide disposition instructions to the warranty administrator within 5 days after receiving initial Marine Corps notification of defect. The warranty administrator shall take action as appropriate.

(4) When parts replacement is required, the contractor shall respond within 5 days of its intention to furnish identified parts and shall provide same within 5 days after receipt of notice by the contracting officer/warranty administrator.

5. Storage Procedures. Specific tasks to be performed before placing the item in storage and while the item is in storage shall also be identified in the ALO.

6. Safety Recall

a. If a safety recall occurs during the equipment warranty period, the contractor shall, per the contract, extend the term of the warranty for each piece of equipment on an item-by-item basis, by a period equal to the time required to make necessary safety defect corrections on each piece of equipment. Extensions of warranty coverage shall be annotated in the remarks section of the equipment record jacket or as directed if equipment record jackets are not used.

* b. Once it has been determined by the contractor that a problem is safety related, it shall be the responsibility of the contractor, as defined by the terms of the contract, to furnish a defect information report to the CMC (L), CG MCRDAC, and MCLB Albany (WS/EM), for each defect in the equipment produced under the applicable contract. This report shall be submitted within 5 working days after the defect on the equipment or components have been identified.

c. It shall be the responsibility of the contractor, as defined by the terms of the contract, to maintain a record of equipments initially shipped to consignees identified on the DD Form 250 (Material Inspection and Receiving Report).

d. The contractor, as defined by the terms of the contract, shall remedy safety defects or failures, including the replacement or correction of defective parts in the Government inventory, and shall provide the Marine Corps with any reports required during the remedy process.

e. Additionally, the contractor, as defined by the terms of the contract, shall provide all the necessary instructions for the Government to implement the remedy process, including the information required for the Marine Corps to determine the impact of the remedy process on its publications. The information regarding the remedy process will be in a format similar to that of modification instructions (MIs) or technical instructions (TIs).

7. Warranty Dispute Claim

a. Definition. Failure of the Marine Corps and a contractor to agree on who is responsible to repair/replace any item submitted per the warranty procedures shall be a dispute concerning a question of fact within the meaning of the disputes clause of the contract.

b. Dispute Settlement. In situations where the contractor declines to repair or replace items for which the Marine Corps believes itself to have a valid warranty claim, or when the contractor furnishes parts and services to the Marine Corps and later claims that replaced parts were not damaged due to defect in design, materials, and workmanship; a settlement will be reached through the contracting officer as follows:

(1) Contractor declines repair.

(a) When a contractor, or an authorized dealer declines to repair an item under warranty, the user should notify the warranty coordinator and proceed to repair the item. Normal supply and maintenance procedures should be used.

(b) The warranty coordinator shall immediately report the situation by message to the MCLB (Code 856) Albany with an information copy to the user, per MCO 4855.10, as follows:

1 Identify equipment and reference original SF-368 reporting defect.

2 Record "warranty dispute" and a complete description of the failure.

3 Enter name, activity, and telephone number of person submitting the warranty dispute.

4 Enter name, address, and telephone number of the contractor representative or dealership that refused the service.

5 Enter specific reason(s) given for refusal.

6 Enter the specific facts/evidence that will refute the contractor's reason(s) for refusal, including photographs and sketches, if possible.

(c) The warranty administrator shall forward warranty disputes submitted by the warranty coordinator to the contracting officer for resolution with the contractor.

(2) Contractor requests reimbursement.

(a) When the contractor makes an analysis, and claims that part(s) failure was not due to defective workmanship, materiel, or design deficiency; the Government will be invoiced for all costs and expenses incurred.

(b) If the contracting officer decides the contractor's claim is valid, the warranty administrator will be notified.

8. Cash Reimbursements From Contractors

a. Cash reimbursements from contractors shall be considered an overpayment on a public voucher and shall be collected per paragraph 043108 of the Navy Comptrollers Manual (NavCompt Manual).

b. Any proceeds resulting from a reduction in the contract price as represented by a cash refund will revert to the appropriation concerned.

c. When collecting the reimbursements the DD Form 1131 (Cash Collection Voucher) will be prepared per paragraph 047223-2 of the NavCompt Manual. To properly prepare the voucher the warranty administrator must ensure that the appropriation data associated with the warranted system is included on the voucher. The APO will provide that information to the warranty administrator in the ALO. In addition to the copies of the voucher necessary to process it through the disbursing channels the warranty administrator shall

ensure that a copy is forwarded to the APO for the system to ensure the reimbursement is credited to the proper account. The warranty administrator shall retain a copy of the voucher as part of the information base to be provided in the Warranty Usage Report.

9. Government Forms

a. Record the commencement date of the warranty in the appropriate equipment record (refer to the ALO for appropriate form to be used).

b. SF 368. Prepare a message in SF 368 format and forward to the MCLB (Code 856) Albany per MCO 4855.10, with an information copy to the warranty coordinator.

c. NAVMC 10925 (EROSL). Use this form as a source document to report repair parts used/provided by the warranty dealership, using a "WP" advice code in order to establish demand/usage history. Ensure this usage data is reported to Marine Corps Integrated Maintenance Management System/Supported Activities Supply System (MIMMS/SASSY) per the current edition of UM 4790-5 and the following:

(1) The purpose of the advice code "WP" is to administratively record usage data on warranty parts requisitioned "off-line" from nonsystem sources.

(2) When consumable repair parts for a warranty item are required, the using unit shall submit a MIMMS "4" parts transaction with a "WP" advice code. This transaction will generate usage data via a "DHA" but will not pass a requisition to SASSY. The actual requisitioning of the required parts will be accomplished per the instructions provided by the warranty administrator.

(3) Upon receipt of the warranty part, the using unit shall submit a MIMMS "8" parts transaction with the authority code of "2" to indicate "receipt" for the item on the Daily Process Report and close the parts trailer while capturing lead time data.

(4) For secondary reparables, the maintenance facility effecting repair shall submit the appropriate "4" and "8" part transactions using the secondary reparable national stock number.

d. NAVMC 1018 (Inspection/Repair Tag). Use this form to tag defective parts to be returned to the contractor, per TM-4700-15/1. Include the SF 368 number on the tag.

e. NAVMC 10245 (Equipment Repair Order (ERO)). Prepare per TM-4700-15/1 and provide the pink/photo copy with the returned parts. Ensure usage data is reported in the MIMMS AIS per UM 4790-5.

f. Equipment Storage Report. The contractor shall provide the blank report formats as shown in Figure 1 to the Government representative prior to equipment removal from plant. The forms shall be completed as follows (for each equipment shipped and distributed):

(1) Part I is completed by the Government representative when the end item leaves the contractor for the storage facility.

(2) Part II is completed by the unit representative when the equipment is placed in storage. One copy of part II will be provided to/for:

(a) The contractor (Attn: Warranty Administrator).

(b) The ACO/PCO.

(c) The equipment.

(d) The unit files.

(e) CG MCLB Albany, GA 31704-5000 (Attn: Warranty Administrator, Code WS/EM).

(3) Part III is completed by the unit representative when the equipment is removed from storage. One copy each to:

(a) The contractor (Attn: Warranty Administrator).

(b) The ACO/PCO.

(c) The equipment.

(d) CG MCLB Albany, GA 31704-5000 (Attn: Warranty Administrator, Code WS/EM).

(e) The CMC (LM).

(f) The unit files.

MCO 4105.2
4 Nov 1987

I. EQUIPMENT DATA

A. CONTRACT NUMBER _____

B. EQUIPMENT SERIAL NUMBER _____

C. DD 250 ACCEPTANCE DATE _____

D. DD 250 SHIPMENT NUMBER _____

E. MANUFACTURER'S SERIAL NUMBER _____

F. TYPE OF STORAGE PROGRAM: MO _____ CRSP _____ DEPOT _____ MPS _____

II. DEPOT STORAGE ENTRY DATA

A. LOCATION _____

B. NSN _____

C. STORAGE DATE _____

D. EQUIPMENT MILEAGE _____

E. DATE REPORT FORWARDED TO CONTRACTOR _____

F. DEPOT REPRESENTATIVE SIGNATURE _____

G. TYPE OF STORAGE PROGRAM: MO _____ CRSP _____ DEPOT _____ MPS _____

III. DEPOT STORAGE REMOVAL DATA

A. REMOVAL DATA _____

B. EQUIPMENT MILEAGE _____

C. FINAL DESTINATION _____

D. DATE REPORT FORWARDED TO CONTRACTOR _____

E. DEPOT REPRESENTATIVE SIGNATURE _____

Figure 1.--Equipment Storage Data.

ENCLOSURE (2)

EXPECTED FAILURE CONCEPT

1. The expected failure concept is based upon the premise that the Marine Corps acquires weapon systems to satisfy a stated requirement. Specifically, the Marine Corps will identify a minimum level of reliability for the system being acquired. This reliability will usually be expressed in terms, such as mean time between failure or failure rate and operating hours for the system. During the design of the system, the developing contractor will allocate reliability requirements to subsystems, components, and piece parts that make up the system. Because of limitations (which include cost, technology, and materials) that exist in the acquisition of a system the Marine Corps seldom, if ever, requires a system to possess 100 percent reliability. The Marine Corps recognizes and plans for periodic equipment failures; however, the Marine Corps wants to ensure that these failures do not exceed those normally expected when a certain level of reliability is specified and the system is being utilized in the operating cycle designed for. As long as the system does not exceed the number of failures expected, the contractor has met the specified reliability and should not be held liable if the system fails. When the failures exceed the number expected, the contractor has failed to meet the requirements of the contract and the Marine Corps should seek corrective action for the deficiency.

2. To apply this concept to warranty requirements for the system, first, determine the desired duration of the warranty. Be sure to include in that determination any time that system will be in storage after acceptance by the Government. Next, determine the operating hours during the warranty period. Using that figure and the reliability value specified in the contract, calculate the expected number of failures for that system during the warranty period. Multiply that figure by the number of systems covered in that production lot. The result is the expected number of failures for the system under warranty. This figure is the threshold that must be breached to invoke the warranty. As long as the number of failures is below the threshold, the contractor is not liable; when the threshold is breached each failure becomes a warranty claim. Expected failure thresholds should be determined for all components reparable at fourth echelon or higher to be covered by the warranty. The warranty coordinator will report all failures of warranted items to the warranty administrator, who will track the failures and determine when the threshold is breached. Once breached the warranty administrator invokes the warranty by notifying the

contracting officer using procedures detailed in enclosure (2). An example follows:

SU = SYSTEMS USAGE (HOURS, MILES, ETC.)

MTBF = MEAN TIME BETWEEN FAILURE

SYS = NUMBER OF SYSTEMS IN PRODUCTION LOT

F = NUMBER FAILURES

SU = 20000

MTBF = 1000 HRS.

SYS = 100

F = X

SU / MTBF x # SYS = X

20000 / 1000 x 100 = X or 2000 is the expected number of failures for the system. When the 2001st failure is recorded then the warranty administrator would start submitting warranty claims.

WARRANTY USAGE REPORT
NOMENCLATURE, NSN, MODEL #
REPORT SYMBOL MC-4105-01

Contract Number Include Lot #	Contractor Name	Federal Supply Code of Manuf (FSCM)	ALO No. and Date	Serial Lot Registration # Range	Warranty Duration	Usage Limits Hrs/rds/miles

ENCLOSURE (4)

Start Date of 1st Item Warranty Period	End date of last item Warranty Expiration	Contract Cost of Warranty and Item Cost	Claim Data				
			# Submitted	$ Honored	$ Disputed	$ Denied	Reason for Denial

* Note: If desired attach a separate remarks page.

ENCLOSURE (4)

APPENDIX G

WARRANTY FOCAL POINTS

DEPARTMENT OF DEFENSE

OFFICE	LOCATION	TELEPHONE
Office of the Director, Defense Procurement	Room 3C762 Pentagon Washington, DC 20301	DSN 225-4235 (703)695-4235

ARMY MATERIEL COMMAND

Policy/Executive Agent for Warranty	AMCAQ 5001 Eisenhower Avenue Alexandria, VA 22333-0001	DSN 284-6699 (703)274-6699
Armament, Munitions, and Chemical Command	AMSMC-QAD-P, AMCCOM Rock Island, IL 61219-6000	DSN 793-6459 (309)782-6459
Aviation and Troop Command	ATCOM-A-WC St. Louis, MO 63120-1798	DSN 693-3425 (314)263-3425
Communication and Electronics Command	AMSEL-ED-PH-W, CECOM Ft. Monmouth, NJ 07703-5000	DSN 992-1336 (908)532-1336
Depot Systems Command	AMSDS-QA-S, DESCOM Chambersburg, PA 17201-4170	DSN 570-9946 (717)267-9946
Missile Command	AMSMI-RD-QA-TI-CF Redstone Arsenal, AL 35898-5000	DSN 788-2996 (205)842-2996
Tank-Automotive Command	AMSTA-MMAP Warren, MI 48397-5000	DSN 786-7424 (313)574-7424

NAVY

Office of the Assistant Secretary of the Navy	ASN (RD&A) APIA-PP 2211 Jefferson Davis Hwy, Rm 546 Arlington, VA 22202	DSN 332-2793 (703)602-2793
Office of the Chief of Naval Operations	OP412 Spares Programs and Policies Branch Washington, DC 20350-2000	DSN 225-2943 (703)695-2943
Commander Naval Air Systems Command	AIR 5162 QA Washington, DC 20361-5162	DSN 222-5863 (703)692-5863

Appendix G Warranty Focal Points

Commander Naval Sea Systems Command	SEA 06Y Washington, DC 20362-5101	DSN 332-8518 (703)602-8518
Commander Naval Supply Systems	SUP 4232D Washington, DC 20376-5000	DSN 222-5305 (703)692-5305
Commander Space and Naval Warfare Systems Command	SPAWAR 213A Washington, DC 20363-5100	DSN 332-8236 (703)602-8236

AIR FORCE

Warranty Contracting	SAF/AQCS Pentagon Washington, DC 20330-1000	DSN 227-6400 (703)697-6400
Maintenance Policy Division	HQ USAF/LGMM Pentagon Washington, DC 20330-1530	DSN 227-1493 (703)697-1493
Air Force Materiel Command	HQ AFMC/PKP Wright-Patterson AFB, OH 45433	DSN 787-6040 (513)257-6040
Aeronautical Systems Center	ASC/ALT Wright-Patterson AFB, OH 45433	DSN 785-8572 (513)255-8572
Electronics Systems Center	ESC/EN-2 Hanscom AFB, MA 01731-5000	DSN 478-3943 (617)377-3943
Space Systems Center	SSC/SDFE Los Angeles AFB, CA 90009-2960	DSN 833-2429 (310)363-2429
Ballistic Missile Organization	HQ BMO/ALMP Norton AFB, CA 92409-6468	DSN 876-7821 (714)382-7821

MARINE CORPS

Marine Corps Systems Command	COMMARCORSYSCOM (PSL) Quantico, VA 22134-5080	DSN 278-5867 (703)640-5867

APPENDIX H

WARRANTY VARIANTS

Warranty of Supplies; Warranty of Systems and Equipment Under Performance Specifications or Design Criteria

Objective: Extend contractor responsibility for materials, workmanship, and specification conformance beyond acceptance of supply items by the Government.

Description: Contractor liability for the adequacy of materials, workmanship, and specification conformance is extended into initial post-acceptance field operations. Duration is negotiable. Remedies include correction of deficiencies, one-for-one exchange, repair of deficient items, or reduction in contract price. Burden of proof rests with the Government. Although repairs or replacement is the responsibility of the contractor, unauthorized Government maintenance or prior repair could void the warranty. Transportation charges are the responsibility of the contractor.

Applicability: Fixed-price contracts for stable design items.

Measurement: Begins at acceptance. Based on performance in accordance with contract requirements.

Warranty of Technical Data

Objective: Extend contractor responsibility for satisfactory technical data to the post-acceptance time frame.

Description: Contractor warrants that technical data conforms to contract requirements that prevail at time of data delivery. Purpose is to ensure accurate and complete data. Remedies include correction or replacement of data, price or fee adjustment, or contractor repayment of damages, generally limited to no more than 10% of the total contract price.

Applicability: Fixed-price contracts and cost reimbursement contracts.

Measurement: Specified in terms of conformance to control data requirements.

Warranty of Technical Publications

Objective: Extend contractor responsibility for satisfactory technical publications into post-acceptance time frame.

Description: Contractor warrants that technical publications conform to contract requirements which prevail at time of delivery. Includes technical publication updates. Purpose is to ensure accurate and complete data. Duration of coverage is usually up to three years. Remedies include correction or replacement of technical publications, price adjustment, or contractor repayment of damages, generally limited to no more than 10% of the total contract price.

Applicability: Fixed-price contracts and cost reimbursement type contracts.

Measurement: Specified in terms of conformance to contract data requirements.

Reliability Warranty

Objective: Reduce failures during intervals between periodic overhauls.

Description: Contract contains a contractor or service overhaul interval for specified components and identifies remedy required when components (on an individual or statistical basis) experience specified types of failure before next overhaul.

Applicability: Critical, potentially high-failure-rate components. Fixed-price contract.

Measurement: User must maintain individual time-to-failure records for the affected component.

Maintainability Guarantee

Objective: Reduce MTTR.

Description: The contract contains maximum mean time to remove and replace, maximum time to remove and replace for components of the specified end item, limitations on special tools required, and maximum number of personnel required for each maintenance task. Technical publication procedures must be accurately defined and technical publications followed during maintenance.

Applicability: Critical, potentially high MTTR end items and components.

Measurement: One time test: maintainability demonstration; multiple tests: user must maintain individual MTTR/crew-size records for the affected end item.

Reliability and Maintainability Warranty

Objective: Motivate the producer to increase equipment reliability, while reducing the mean corrective maintenance time (MCMT).

Description: Contract contains MTBF guarantee for specified components and maintainability clause specifying MCMT. Contract identifies remedies for when MTBF or field maintainability specifications are not met.

Applicability: Critical, potentially high-failure-rate installed components and other mission-critical installed components. Fixed-price type contract.

Measurement: User maintains individual time-to-failure and MCMT records for affected components.

Reliability Improvement Warranty

Objective: Achieve acceptable reliability and motivate contractor to improve.

Description: Contractor repairs all covered failures and may implement no-cost ECPs for R&M improvements.

Applicability: Items must be depot reparable (for example, avionics at LRU or SRU level.

Measurement: Contractor performs depot maintenance for three to five years. Turnaround time, exclusions, and no evidence of failure/retest okay (RTOK), if applicable, are computed periodically.

Reliability and Maintainability Improvement Warranty (R&MIW)

Objective: Achieve acceptable reliability and maintainability and motivate contractor to improve.

Description: Contractor repairs all covered failures, makes design changes to improve maintainability, and may implement no-cost ECPs for R&M improvement.

Applicability: Units must be depot reparable.

Measurement: Contractor performs depot maintenance for three to five years. Turnaround time, exclusions, no evidence of failures/RTOKs, and maintainability values are computed using algorithms specified in the warranty clause.

Mean Time Between Failure—Verification Test (MTBF—VT)

Objective: Provide assurance that required field MTBF level will be achieved.

Description: Contractor guarantees field MTBF. Verification testing is conducted and results are compared with guaranteed value. Contractor must develop and implement solution if guaranteed MTBF is not achieved. Corrections may also include provisions for consignment spares or downward price adjustment.

Applicability: MTBF is appropriate reliability parameter and field measurement can be made.

Measurement: Specified in terms of measured relationship to target MTBF.

RIW with MTBF—VT

Objective: Achieve reliability growth and ensure that required field MTBF level will be achieved.

Description: Time-phased MTBF thresholds specified together with methods for assessing MTBF. Remedies are usually in the form of no-cost consignment spares, accelerated repair turnaround time, and/or engineering analysis and corrective design and production changes.

Applicability: Items should be under contractor maintenance; MTBF is appropriate reliability parameter; and field measurement can be made.

Measurement: Deployment from three to five years. Measurements at regular intervals over the coverage period.

R&MIW with MTBF—VT

Objective: Achieve reliability and maintainability growth and ensure that required field MTBF will be achieved.

Description: Same as for R&MIW plus time-phased MTBF thresholds specified together with MTBF assessment methods. Remedies are usually in the form of no-cost consignment spares, accelerated repair turnaround time, and/or engineering analysis and corrective design and production changes.

Applicability: Items should be under contractor maintenance; MTBF is appropriate reliability parameter; and field measurement can be made.

Measurement: Deployment from three to five years. Measurements at regular intervals over the coverage period.

Component Reliability Warranty

Objective: Contractor and Government mutually select and agree on the spare parts that should be covered under a program designed to guarantee a minimum level of reliability.

Description: Contractor and Government mutually agree on target reliability values. Government generates monthly performance report. Both parties investigate reliability deficiencies and agree on corrective action. Remedies may include additional spares, correction of deficiencies, one-for-one replacement of chronic units, and redesign and no-charge retrofit kits.

Applicability: Components critical to overall satisfactory operational system performance. Items of high technical risk, reparability, and cost.

Measurement: Commences with initial delivery of parent system and continues for a specified number of years or until fleet MTBF and MTTR targets are met.

Chronic LRU Guarantee

Objective:	Identify and correct deficiencies in items which are experiencing abnormally frequent failures.
Description:	Chronic LRU defined as having mean time between replacement (MTBR) significantly below guaranteed value. Replaced at no cost to the Government and quarantine testing until chronic fault is isolated and repaired. Duration of chronic LRU guarantee normally compatible with underlying MTBR and MTBF guarantees
Applicability:	Selected high-cost LRUs for which MTBR guarantees are established. Generally used on complex, difficult-to-repair items.
Measurement:	Based on frequency of LRU removals. Frequency is measured in terms of operating hours, chronological time, flight hours, or other similar unit of measurement.

Availability Guarantee

Objective:	Ensure that required operational availability will be achieved.
Description:	Focuses on measurable population characteristics; availability specified as threshold or range. Remedies include the contractor provision of additional "no-cost" units, modification, redesign, or a combination in order to improve availability to the minimum specified level.
Applicability:	Dormant systems or continuously operating systems.
Measurement:	Dormant systems: periodic checkouts, test launches, or BIT checks. Continuously operating systems: uptime/total time ratio or MTBF and MTTR measurements.

Logistics Support Cost Guarantee

Objective: Control and reduce LSC.

Description: Contractor "bids" TLSC based upon use of a model. Field parameters are measured, and the model is used to obtain MLSCs, which are compared with the target. Remedies include adjustment of contract price based on measured versus target values and possibly deficiency correction.

Applicability: Appropriate LSC model exists. May require special test program to obtain measured values.

Measurement: Based on operational evaluation testing focused on use of LSC model to determine compliance in terms of MLSC. Incentives or corrective actions based on differences between MLSC and target values.

Maximum Parts Cost Guarantee

Objective: Establish ceiling on materials cost (parts and labor) per unit of measure (flying hours) for maintenance, repair or overhaul.

Description: Contractor reimburses Government when actual maintenance cost exceeds agreed maximum. Guarantee commences with first use of product and extends for specified minimum number of years (normally five) or length of time item in service.

Applicability: Mission-essential complex items new to the service and characterized as high technical risk, new technology, or high per-unit cost.

Measurement: Specified in terms of parts or materials cost per flying hour or other unit of measure for maintenance, repair, or overhaul.

Spare Parts-Level Warranty

Objective:	Maintain the original system or aircraft capability with a lowered (LRU or SRU) MTBR.
Description:	Contractor guarantees that if the system or item exceeds a -XX% envelope from a guaranteed MTBR, spare system or items or major components will be provided as consignment spares. If multiple tests are made over time, appropriate adjustments will be made for exceeding a +XX% envelope.
Applicability:	Fixed-price contracts for equipment or items which are prime mission essential or operational safety essential. Designed for service organic maintenance.
Measurement:	Government maintains running monitor on MTBR or MTBF.

Utility Functions Guarantee

Objective:	Increase reliability, durability, serviceability, or other performance features of consumable items.
Description:	A utility function or consumption index is defined.
Applicability:	Normally consumable components such as tires, brakes, batteries. Fixed-price type contract.
Measurement:	Level of performance achieved in a demonstration versus defined index.

Ultimate Life Warranty

Objective: Increase reliability to reduce premature failure.

Description: Prorate protection against cost of failure(s) which occur prior to end of warranted life period or otherwise require retirement or replacement prior to end of warranty.

Applicability: Normally large, basic elements such as airframe structure and engines, but also major components such as engine rotating parts and landing gear.

Measurement: Specified in terms of period of time. No reporting.

Commercial Service Life Warranty

Objective: Provides extended coverage for anticipated service life.

Description: After expiration of primary warranty, contractor shares in cost of materials required to correct any defects or breakage in covered items.

Applicability: Major systems, subsystems, and structural components.

Measurement: Begins at expiration of primary warranty, prorated on specified basis for an established period thereafter.

Software Design Commitment Guarantee

Objective: Improve software development practices. Improve software maintenance characteristics.

Description: Provide incentives to develop software packages that require little or no routine maintenance, yet are easily maintained when required. Elements of design maintainability include: good documentation during development, development of superior debug and test diagnostics, and development of software that runs on different machines.

Applicability: Software in the early development phase (embedded or automated data processing).

Measurement: Delivered software products are measured against design requirements.

LRU Software Configuration Control and Support Agreement

Objective: Guarantee software and hardware compatibility as well as correct any software errors.

Description: If hardware changes that are due to contractor responsibility result in a requirements for a software change, that change and the resulting configuration control are at the contractor's expense. If errors are discovered in the software, then changes and the resulting configuration control are at the contractor's expense. If, for any reason, software changes are required to improve system performance to specified levels, then these changes and the resulting configuration control are at the contractor's expense.

Applicability: Systems that include both hardware and software, generally in conjunction with a hardware warranty.

Measurement: Specified in terms of conformance to configuration or performance criteria.

Fault Detection, Isolation, and Repair Warranty

Objective: Reduce the mean troubleshooting time (MTT) to a guaranteed level and maintain that reduced MTT for a specified period of time.

Description: The contractor guarantees that failure modes and effects analysis (FMEA) and the equipment, software, and technical publications will find and isolate XX% of the possible faults within a given average mean time.

Applicability: Fixed-price contracts for operational systems or aircraft that are intended for organic support.

Measurement: Based on specific MTT, MTTR, or other similar unit of measure. Measurement commences with Government acceptance.

Test and Repair Improvement Guarantee

Objective: Ensure that test equipment and applicable procedures will reliably demonstrate MTBR or MTBF guarantees.

Description: Normally 90% of units tested will demonstrate an MTBR or other unit of measure greater than XX% of MTBF guarantee. Chronic units are excluded from the count unless identified to a test deficiency. Deficient test equipment or procedures should be improved to conform within a specified number of days (normally 90) of being determined deficient.

Applicability: Test equipment for mission-essential items covered by performance specifications. Applicable to complex test equipment, limited in number, high cost, and critical to performance verification.

Measurement: Based on specific MTBR, MTBF, or other similar unit of measure. Measurement commences with Government acceptance.

Quality of Training Warranty

Objective: Ensure the level of skill and knowledge available in the repair shops at all levels of maintenance.

Description: Behavior required to properly troubleshoot and repair end items will be trainable tasks and retainable knowledge to a specified level of intelligence and experience. Contractor further agrees that all of the data required to train those tasks will be provided to the Government. Any training conducted by the contractor will be from the same data provided to the Government. Any additional training the Government requires to overcome knowledge and skill problem within X years will be provided at contractor expense.

Applicability: Fixed-price contracts for items intended for organic maintenance.

Measurement: Major field commands monitor training and MTT or MTTR.

Rewarranty of Repair/Overhauled Equipment

Objective: Warranty coverage for overhauled, repaired, replaced items.

Description: Contractor-repaired or replaced spare parts provided as a result of defects in design, material, or workmanship are rewarranted for the remainder of the warranty period specified in the underlying contract or for a specified number of months (normally 12).

Applicability: Items overhauled, repaired, or furnished by a contractor as a replacement for correction of defects in design, material, or workmanship. Fixed-price type contracts.

Measurement: Begins at acceptance of repair or replacement parts by the Government.

Repair and Exchange Agreements

Objective: Provide for rapid contractor replacement of defective equipment or components.

Description: Contractors establish an inventory of replacement units to meet expected demand requirements within required turnaround times. Inventory levels are periodically adjusted to meet expected demand rates. Contractors also establish or provide for necessary repair capability including provision for surge requirements as necessary. Buy-out of contractor inventories by the Government at the conclusions of these agreements is normally an item for negotiation based upon equipment amortization concepts. Payment for repair or exchange items should be established on a fixed-price per unit basis. An end of agreement adjustment may be established to cover excessive usage by the Government, higher than anticipated unit installations, delays in returning defective units, premium time to meet surge requirements, liquidated damages caused by lack of available exchange units, excessive contractor inventory levels, and excessive amortization costs realized.

Applicability: Used where it is not cost effective to develop organic support.

Measurement: Normally expressed in terms of the frequency of expected repair or exchange and associated turnaround time.

APPENDIX I

WARRANTY CHECKLISTS

WARRANTY DEVELOPMENT CHECKLIST

Program Risks and Goals

- ☐ Has relevant documentation been consulted to identify the significant program risks and requirements in order to develop a meaningful warranty?

Warranty Requirement

- ☐ Have DoD and service policies been used to verify that a weapon system warranty is required?
- ☐ If the requirement for a weapon system warranty is not established, would it still be a good idea to have a warranty to meet program goals or diminish program risks?

Warranty Coverage

- ☐ Have warranties for defects in materials and workmanship and for conformance to design and manufacturing requirements been included?
- ☐ Have candidate EPRs such as reliability, maintainability, and operation performance parameters been considered?

If there is an essential performance requirement, is it:

- ☐ Consistent with the specification?
- ☐ Not easily measured in the laboratory on a one-time basis, but should be covered by a warranty in the field?
- ☐ Measurable in the field without dispute?
- ☐ Translatable to a meaningful remedy in case of failure to comply?
- ☐ Controllable to a reasonable extent by the contractor?

Warranty Strategy

- ☐ Has a warranty strategy been devised that considers such aspects as competition, contractor bid of guarantee values, contractor comment on draft warranty provisions, and warranty RFP language and proposal evaluation?

Warranty Scope

- ☐ Does the warranty clearly identify what units are included and what units are excluded, if any?

Duration

- ☐ Has a realistic and reasonable duration for the warranty been determined?
- ☐ If the warranty ends at different time for each item, will this cause implementation problems?
- ☐ If the warranty duration is related to population hours, such as total flying hours, can accurate measurement be made?

Presumption of Coverage

- ☐ Is the "presumption of coverage" language used to minimize potential disputes?

Exclusions

- ☐ Are there reasonable exclusions from warranty coverage, such as acts of God and combat damage, in order to protect contractor from undue risks?

Contractor Repair

If the warranty requires contractor repair:

- ☐ Is contractor repair acceptable in view of current service capability and mission criticality?
- ☐ Can the warranty units be easily shipped within the terms of the warranty?
- ☐ Can unauthorized maintenance be controlled?
- ☐ Can good returns be minimized?
- ☐ Is there a control on contractor repair turnaround time?
- ☐ Are there reasonable data requirements placed on the contractor to provide repair and failure analysis data?
- ☐ Have plans been made to monitor contractor warranty repair performance?

Field Measurement

If the warranty requires field measurement to verify conformance to an EPR:

- ☐ Can existing service data collection systems be used?
- ☐ If there are no adequate existing data systems, have plans been made and approved to implement a new system?
- ☐ Is using field measurement data to determine conformance to an EPR better than using a special verification test?
- ☐ Has a data collection and analysis plan been developed that clearly defines responsibilities, collection periods, and analysis procedures?

Dormant Systems

If a warranty is related to dormant system performance:

- ☐ Are there long nonuse periods during which deterioration is possible?
- ☐ Are there enough periodic tests performed to measure storage performance?
- ☐ Are there provisions to allow the contractor to monitor storage performance tests?

Cost-Benefit Analysis

- ☐ Have cost-benefit analyses been performed on a timely basis?
- ☐ Do the results of the cost-benefit analyses adequately support the warranty decisions that have been made?

Remedies

- ☐ Have remedies been developed that are equitably related to the degree of warranty breach?
- ☐ Should there be a limit on the total contractor liability such as a cost ceiling related to the total contract value?
- ☐ Is redesign a specific remedy?
- ☐ If reimbursement for Government repair is a remedy, are there specific means to determine the amount of the contractor's liability?

Marking

- ☐ Has marking of warranted items been specified to ensure proper handling and disposition in the field?

Technical Data

- ☐ Do requirements for technical data include adequate reference to the warranty?

Training

- ☐ Does planned training include coverage to implement and manage the warranty?

Transportation

- ☐ Does the warranty state who is responsible for transportation costs?

Implementation

- ☐ Have all possibilities been considered so that support units can unambiguously determine if a warranty breach has occurred?
- ☐ Does the warranty ensure that unacceptable burdens the will not be imposed on the user and support communities?
- ☐ Has a warranty administration or implementation plan been developed?

WARRANTY ADMINISTRATION PLAN CHECKLIST

Introductory Material

- ☐ Have the effective date and duration been identified?
- ☐ Has coordination been completed?

Acquisition Background

- ☐ Is the purpose of the acquisition program clearly stated?
- ☐ Is the purpose of the warranty clearly stated?
- ☐ Is a brief history of the acquisition program included?
- ☐ Is a brief rationale of the warranty selection included?
  - ☐ Are the cost-benefit considerations clearly explained?
  - ☐ Is the EPR selection rationale clearly explained?
  - ☐ Is the rationale for the remedies included?

Weapon System Warranty Terms

- ☐ Are complete warranty terms included?
  - ☐ What is warranted?
  - ☐ How are warranted items identified?
    - ☐ Include illustrations of markings if possible.
    - ☐ Reference technical publications if applicable.
  - ☐ How long does the warranty last?
  - ☐ What are the remedies?
  - ☐ How will data be gathered, recorded, and exchanged?
  - ☐ What are the contractor obligations?

- ☐ What are the Government obligations?
- ☐ What are the exclusions?

Cost-Benefit Analysis

Are the following referenced:

- ☐ Cost-Benefit Analysis?
- ☐ Methodology?
- ☐ Data?
- ☐ Effectivity?

Are the following facts about the analysis included:

- ☐ Limitations?
- ☐ Assumptions?
- ☐ Data accuracy?

☐ Are the conclusions clearly supported?

☐ Is an update of relevant events since the last cost analysis included?

Warranty Administration

☐ Are the warranty responsibilities of each organization, including the contractor, separately listed?

- ☐ Are the responsibilities included in other documents also listed, for example, deficiency reporting?
- ☐ Are the controlling documents referenced such as public law, regulations, memorandums of agreement, and the contract?

☐ Are the information flow paths clearly defined? (A flow diagram may be useful.)

☐ Are reasonable suspense times levied?

☐ Is hardware disposition clearly defined?

When applicable, does the plan address:

- ☐ Post-warranty-period activities, such as configuration updates, transition to organic maintenance, and assessment of warranty benefits?
- ☐ On-equipment (organizational-level) maintenance procedures? (Cite only exceptions to standard procedures.)
- ☐ Off-equipment maintenance procedures (for intermediate, direct support, and general support levels)? (Cite only exceptions to standard procedures.)
- ☐ Depot maintenance procedures? (Cite only exceptions to standard procedures.)
- ☐ RTOK processing?
- ☐ Maintenance data requirements? (Cite only exceptions to standard procedures.
- ☐ Other maintenance exceptions such as FMS and special-use assets?
- ☐ Transportation procedures? (Cite only exceptions to standard procedures.)
- ☐ Contractor data and reporting requirements?
- ☐ Special packaging requirements?
- ☐ Damage reporting?
- ☐ Special storage requirements (resulting from warranty only)?
- ☐ Commingling of warranted and unwarranted assets?
- ☐ Operation of contractor secure storage area?
- ☐ Consideration of stock-issue priorities?
- ☐ Communications procedures for maintenance and utilization data? (Cite only exceptions to standard procedures.)
- ☐ Description of required contractor in-plant procedures?
- ☐ Custody-transfer requirements?
- ☐ ECP processing procedures? (Cite only exceptions to standard procedures.)
- ☐ Configuration control procedures? (Cite only exception to standard procedures.)

- ☐ Warranty impacts on technical orders?
- ☐ Warranty funding?
- ☐ Funding for repair of exclusions?

Warranty Team

☐ Is the warranty team defined?

Is complete identification given including:

- ☐ Complete title?
- ☐ Brief description of team duties?
- ☐ Telephone numbers—Defense Switched Network (DSN) and commercial?
- ☐ Addresses?

Program Management Responsibility

☐ Is the Warranty Administration Plan consistent with any program management transfer responsibilities?

☐ Are any changes in responsibilities delineated for each organization?

☐ Are due dates established in relation to any transfer milestones?

☐ Is a meeting planned as part of any transfer process to discuss and clarify responsibility changes and procedures?

☐ Will the contractual warranty provisions, such as CDRL deliveries, require updating as part of any transfer of responsibilities?

☐ Are updates of memorandums of agreement provided for?

Foreign Military Sales

☐ Does the warranty cover any FMS?

☐ Are there unique FMS warranty considerations?

- ☐ Is another complete plan advisable?
- ☐ Is it referenced here?

Contractor Logistics Support/Interim Contractor Support

- ☐ Is there any contractor logistics support or interim contractor support?
  - ☐ Are contractor warranty responsibilities described?
  - ☐ Are contractor warranty responsibilities required by the Statement of Work?
  - ☐ Has the Administrative Contracting Officer (ACO) been tasked to monitor the contractor logistics support/interim contractor support contractor's warranty responsibilities?
    - ☐ Are the ACO tasks in Chapter 4 of the Warranty Administration Plan?
  - ☐ Does the warranty last longer than the interim contractor support?
    - ☐ Is there a transition plan?
    - ☐ Are contractor responsibilities during and after interim contractor support clearly stated?
- ☐ Are there procedures for a case in which potential conflicts of interest are resolved, for example, if the same contractor is responsible for invoking the warranty and suffering the remedies?
- ☐ Are procedures in place to ensure that warranted items are not repaired under interim contractor support funding?

Schedule

- ☐ Are the major program milestones included?
- ☐ Are the warranty milestones that relate to the program milestones included?
  - ☐ Warranty beginning and end dates.
  - ☐ Special warranty tests.
  - ☐ Contract options.

- ☐ Are any transfer responsibility milestones included?
  - ☐ Including warranty transition milestones?

Training

- ☐ Is the overall program training plan referenced?
- ☐ Is warranty training included with other training where possible?
- ☐ Does the training include all individuals who must make warranty decisions?
- ☐ Does the training include all individuals and their supervisors whose actions could void the warranty?
- ☐ Does training include recognition of warranty markings and their implications?

APPENDIX J

ACRONYMS AND ABBREVIATIONS

ACO	Administrative Contracting Officer
AFMC	Air Force Materiel Command
AFR	Air Force Regulation
AG	Availability Guarantee
AR	Army Regulation
ASD/I&L	Assistant Secretary of Defense (Installations and Logistics)
ASPR	Armed Services Procurement Regulation
AVSCOM	Aviation Systems Command
BITE	Built-In-Test Equipment
C^3	Command, Control, and Communications
CDRL	Contract Data Requirements List
CLIN	Contract Line Item Number
COD	Correction of Deficiency
DCMC	Defense Contract Management Command
DDR&E	Director of Defense Research and Engineering
DFARS	Defense Federal Acquisition Regulation Supplement
DID	Data Item Description
DoD	Department of Defense
DRS	Deficiency Reporting System
DSMC	Defense Systems Management College
DSN	Defense Switched Network
DSS	Decision Support System
ECP	Engineering Change Proposal
EIR	Equipment Improvement Recommendation
EPR	Essential Performance Requirement
ETI	Elapsed Time Indicator
FAR	Federal Acquisition Regulation
FMEA	Failure Modes Effects Analysis
FMS	Foreign Military Sales
FVPDS	Fighting Vehicle Performance Data System
GAO	General Accounting Office
GFE	Government-Furnished Equipment
GFM	Government-Furnished Material
GFP	Government-Furnished Property
LCC	Life-Cycle Cost
LRIP	Low-Rate Initial Production
LRU	Line Replaceable Unit

LSC	Logistics Support Cost
LSCG	Logistics Support Cost Guarantee
MACOM	Major Command
MCCASA	Marine Corps Cost Analysis Strategy Assessment
MCMT	Mean Corrective Maintenance Time
MCO	Marine Corps Order
MDT	Mean Downtime
MIL-STD	Military Standard
MLSC	Measured Logistics Support Cost
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MTBF—VT	Mean Time Between Failure—Verification Test
MTBF	Mean Time Between Failure
MTBFG	Mean Time Between Failure Guarantee
MTBR	Mean Time Between Removal, Repair, or Replacement
MTT	Mean Troubleshooting Time
MTTR	Mean Time To Repair
NAVAIRSYSCOM	Naval Air Systems Command
NAVSEASYSCOM	Naval Sea Systems Command
OSD	Office of the Secretary of Defense
PPI	Preplanned Product Improvement
P.L.	Public Law
PPAC	Product Performance Agreement Center
QDR	Quality Deficiency Report
R&M	Reliability & Maintainability
R&MIW	Reliability & Maintainability Improvement Warranty
RFP	Request for Proposal
RIW	Reliability Improvement Warranty
RTOK	Retest Okay
SAE	Society of Automotive Engineers
SAMI	Systems Acquisition Management Inspection
SECNAVINST	Secretary of the Navy Instruction
SPAWAR	Space and Naval Warfare Command
SR	Service Report
SRU	Shop Replaceable Unit

TEMP	Test and Evaluation Master Plan
3-M	Maintenance Material Management System
TLSC	Target Logistics Support Cost
USC	United States Code
VT	Verification Test
WARCO	Warranty Control Office or Officer
WARM	Warranty Model
WRA	Weapon Replaceable Assembly

APPENDIX K

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This document has been prepared and updated by the Defense Systems Management College to assist DoD program managers in planning and executing weapon system warranties as required by Title 10, Section 2403. It is not a "cookbook" for warranty development, application, and administration, but rather a reference and training aid for program management personnel. Waranty issues throughout the full range of weapon system acquisition and fielding are discussed, from strategy development through operational employment. Key elements include warranty forms and functions, warranty structure, warranty life-cycle, warranty administration, cost-benefit analysis, and lessons learned since enactment of Title 10, Section 2403. Supporting appendix material includes applicable congressional, DoD, and service directives, warranty focal points, and warranty checklists.

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